RESEARCH REPORT

Residential Utility Program Market Trends

Regional metrics, goals, findings, and recommendations for residential measures

Guidehouse

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Disclaimer

Report authors verified the data used for this brief to the best of their ability. This paper reflects the opinion and judgments of the authors and does not necessarily reflect those of board members, sponsors, or project participants and funders.

Authorship

This deliverable was prepared by Guidehouse Inc. Regional energy efficiency organizations in the Midwest, Northeast, and Southeast collaborated and contributed to the creation of this report. Northeast Energy Efficiency Partnerships (NEEP) is expected to publish additional analysis specific to the Northeast in the near future and will be accessible at https://neep.org/resources. Please check this link periodically for updates and access to the latest reports.

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List of Acronyms

AHRI	Air-Conditioning, Heating, and Refrigeration Institute
ASHP	air source heat pump

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BPI	Building Performance Institute
DOE	U.S. Department of Energy
GSHP	Ground source heat pump
HPWH	Heat pump water heater
MEEA	Midwest Energy Efficiency Alliance
NEEP	Northeast Energy Efficiency Partnerships
RBI	Residential Buildings Integration
REEO	Regional Energy Efficiency Organization
SEEA	Southeast Energy Efficiency Alliance
U.S. EIA	United States Energy Information Administration

Executive Summary

Utilities offer rebates for a variety of HVAC, water heating, and envelope solutions that enable customers to reduce upfront upgrade costs and save on energy bills. This report focuses on similar challenges utility rebate programs for air source heat pumps (ASHPs), heat pump water heaters (HPWHs), and building envelope upgrades experience across the Midwest, Northeast, and Southeast. This report identifies and describes the following challenges preventing greater adoption of energy-efficient solutions: low customer engagement in downstream programs, contractor skepticism toward new technologies, high upfront costs for envelope upgrades, limited customer engagement opportunities, and a lack of coordination between HVAC and envelope contractors. Additionally, the report identifies best practices of utility rebate programs, including discussion on participation, cost-effectiveness, and customer satisfaction to help utilities in other jurisdictions tailor and strengthen their programs to meet their program objectives.[1]

Table 1: Rebate Programs Reviewed by Region and Technology

Technology	Midwest	Northeast	Southeast
ASHP	34	33	-
HPWH	26	-	7
Envelope Measures	70	23	13

Research on 2024 rebate program offerings and interviews with program administrators uncovered cross-cutting themes in rebate programs across the Midwest, Northeast, and Southeast. Accounting for the regional and technology variations in program requirements and needs, this report highlights successful approaches that could provide insights for rebate programs in comparable climate and regulatory environments to meet similar program objectives. The report findings represent rebate programs offered to a substantial portion of residential utility customers in each targeted region: approximately 53% in the Midwest, 82% in the Northeast, and 43% in the Southeast (U.S. Energy Information Administration 2024).

Air Source Heat Pump (ASHP) Program Findings

The majority of energy efficiency programs reviewed for ASHPs employ downstream approaches in the Midwest and Northeast. Eight midwestern programs employ midstream approaches, including one program that combines mid- and up-stream elements.[2] These utilities shifted from a downstream to a midstream approach due to regulatory requirements, program cost savings, and to simplify the program for

[1] Regional Energy Efficiency Organizations (REEOs) in the Midwest, Northeast, and Southeast collected data and conducted interviews with program administrators to inform utility rebate program trends. Not all regions collected data on all measure types. Regions also had varying level of detail in program data.
[2] Downstream approaches offer rebate incentives to end user customers, while midstream and upstream approaches offer rebates to those higher in the value chain, such as contractors and distributors.

contractors. Average rebates offered in the Midwest range from $475 to $929 per project. Rebate offerings in the Northeast vary by end use: cooling capacity rebate offerings range from $480 to $5,150 per customer and heating capacity rebate offerings range from $1,033 to $1,333 per customer.[3] Programs for both ducted and ductless whole home solutions incentivized by project, not capacity, offer the highest average minimum rebate amounts in the Northeast. ASHP incentives for midstream approaches tend to be lower because the program reduces costs by shifting focus to distributors and contractors and focuses on completing a higher volume of projects. Midstream approaches also improve ASHP supply availability.

Shared challenges with ASHP rebate programs include high incremental costs for electric ASHPs compared to gas systems, contractor skepticism to ASHPs, limited contractor time to receive trainings, installation quality issues such as oversizing, and long rebate applications. Some program administrators favor per project or per residence measures, offer bonuses for quality installations, or offer bonuses for integrated controls that retain fossil fuel heating to overcome the cost and installation barriers.[4] Addressing contractor skepticism, attracting contractors to trainings, and adjusting rebate applications requires customer-centric program adjustments, such as providing third-party resources, staff to engage customers, or a shift to a mid- or upstream approach.

Heat Pump Water Heater (HPWH) Program Findings

Midwestern rebate programs offering HPWH rebates favor downstream approaches, with 21 programs using downstream approaches, four programs using midstream approaches, and one program using a combined upstream and midstream approach. The average rebates offered by midwestern utilities range from $460 to $584 per water heater. Rebate amounts in the Southeast range from $250 to $1,150 per water heater, based on data from 13 rebate program administrators in eight states.

HPWH rebate program administrators cite similar challenges in the Midwest and Southeast, including contractor resistance to new water heating technologies and a lack of understanding on how to install HPWHs. Contractors cite perceived maintenance complexities and installation logistics that differ from a standard water heater as reasons for their resistance. Improper installations leading to shortened equipment life present challenges to developing interest in HPWHs. Early adopters of HPWHs in both regions are technology-friendly contractors, who may serve as good promoters of the rebate programs, but overall HPWH participation lagged compared to other product offerings within the utilities' energy efficiency portfolios. Installation based on manufacturer specifications can reduce or lower the risk of equipment lifespan failures.

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[3] The ASHP rebate program data reviewed for the Midwest covered single-family and multifamily homes but only single-family for the Northeast. Northeast data also did not include smaller municipal or electric cooperative utilities in the region.

[4] Oversizing can come from a misconception that more capacity is better for the application of ASHPs and by installers not using load calculations, leading to more expensive, less efficient oversized systems.

Rebate program administrator programs in both regions continue to refine the relatively new HPWH rebate programs to overcome challenges and realize energy efficiency savings.

Building Envelope Measure Program Findings

Utility rebate offerings for envelope measures in the Midwest, Northeast, and Southeast include whole home retrofits, attic insulation, air sealing, duct sealing and insulation, wall insulation, energy efficient windows, and roof insulation, and predominantly use downstream approaches. Insulation and air sealing programs make up the most popular envelope measure rebates across the three regions. In contrast, program administrators struggle to offer whole home retrofit and window replacement rebates to market rate customers that pass utility cost-effectiveness tests. Utility rebate programs in all three regions typically cover the entire cost of the upgrades for income-qualified customers.[5] Beyond offering rebates, programs across regions offer financing options, such as on-bill financing, to help customers with the upfront costs of upgrades.

The most common midwestern envelope rebates include attic insulation, air sealing, and duct sealing and insulation. Six programs offer whole home retrofit rebates; five programs offer energy efficient window rebates; and four programs provide roof insulation rebates. Incentive amounts vary widely based on measure, with whole home envelope programs offering an average maximum rebate of $1,667 per market rate customer.

Air sealing and insulation make up the majority of northeastern rebate offerings, and four of the 23 programs reviewed offer window and duct sealing incentives. Nine programs offer whole home or weatherization assistance for income-qualified customers, and two jurisdictions offer standalone window replacement rebates. All northeastern programs provide low-cost financing or on-bill repayment options for market rate customers.[6] Envelope measure rebates range from several hundred dollars for specific envelope measures to $2,000 to $5,000 for market rate insulation and air sealing upgrades.

Program administrators face common challenges across jurisdictions for ASHP, HPWH, and envelope programs. This report summarizes similar approaches taken to increase customer engagement, support contractors, and improve program offerings. Programs that involve strong engagement with contractors are cost-effective and adapt to customer needs to increase interest.

[5] Income-qualified customers are defined by utilities as meeting certain eligibility criteria such as income as a percent of federal poverty levels, area median income, enrollment in government assistance programs, and more.
[6] Market rate customers are defined as a typical or average customer who does not meet other income-eligibility criteria.

The thirteen southeastern utility rebate programs reviewed in this report mostly offer insulation and air sealing offerings. Utility rebates for envelope measures in this region tend to be per project for whole home or per square foot in all other cases. Southeastern utilities sometimes offer market rate customers on-bill repayments with rebates applied to the total cost of upgrades as well.

Envelope rebate programs across regions face challenges with calibrating rebate amounts because customers do not wish to pay remaining upfront costs compared to the payback period. Other challenges include landlord interest and homeowner awareness of programs, occupant disruption for installations, and coordination with HVAC rebate programs. Solutions to envelope rebate program challenges included educational materials for customers, strategic marketing within the program service territory, partnerships to increase total incentive amounts, and program designs that required coordination between envelope and HVAC contractors.

Cross-Regional Challenges and Opportunities for Program Improvement

The table below lists cross-regional themes for program challenges and opportunities for program improvement identified through the REEOs' interviews with program administrators. Solutions such as shifting from midstream approaches require deep program changes that only well-resourced programs can implement. Other solutions, such as providing talking points to contractors or partnering with other utilities or non-profit groups, can be applied across utilities regardless of their program budgets. Program administrators should consider how solutions align with program objectives and resources to test these strategies to improve outcomes for customers.

Rebate Program Challenges	Possible Solutions
Low Engagement with Downstream Approach: Utilities note issues with low rebate submissions and dependency on contractors to correctly submit applications in a downstream approach.	**Shifting to a midstream or upstream approach** helps programs redesign rebate applications to shift rebate forms away from customers and contractors to work directly with distributors. **Utilizing expert staff** can answer customer questions and expand awareness of programs to deepen customer and contractor engagement.
Contractor Skepticism towards New Technologies: Stakeholders across the Midwest, Northeast, and Southeast highlight that contractors feel reluctant to adopt unfamiliar technologies, including ASHPs and HPWHs, due to performance uncertainty.	**Developing and sharing third-party verified information** reduces contractor skepticism because contractors do not trust performance data from salespersons, such as manufacturers, distributors, or wholesalers. Utilities identified third-party information as a useful source that local contractors would trust.

Rebate Program Challenges	Possible Solutions
High Upfront Costs for Envelope Upgrades: Customers view envelope programs unfavorably across regions due to occupant disruption and high upfront installation costs compared to the payback period. Some contractors believe that rebate amounts are too low compared to the effort required to complete the upgrades, leading to lower participation.	Working with other utilities or non-profits to **stack rebates or cover the full costs of upgrades** can increase the total incentives available for envelope upgrades. **Developing strong relationships with multifamily building owners** can encourage them to undertake whole home comprehensive upgrades, rather than piecemeal upgrades, to maximize energy savings and resident comfort.
Limited Customer Engagement Opportunities: Educating and engaging with customers in-person presents a challenge for utilities due to limited staff resources or a large and/or dispersed customer base.	**Educating contractors**, who then inform customers, on utility program offerings for emergency or routine equipment replacements expands the program's reach. **Providing talking points** to contractors to use during site installations standardizes communication.
Coordination Challenges between Heat Pump and Envelope Contractors: Midwestern utilities noted a lack of coordination between equipment and envelope contractors could lead to lower customer satisfaction and project inefficiencies. HVAC contractors focus on equipment, rather than coordinating with envelope contractors to time installations and size equipment correctly.	**Offering bonuses or bundled incentives** for coordinating HVAC and envelope upgrades and **requiring the incorporation of envelope measures** for projects can encourage collaboration between the different contractors by incentivizing coordination.

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1 Introduction

1.1 Background and Purpose

This report summarizes the current landscape of residential air source heat pump (ASHP), heat pump water heater (HPWH), and building envelope efficiency programs in the Midwest, Northeast, and Southeast based on program data collected by Midwest Energy Efficiency Alliance (MEEA), Northeast Energy Efficiency Partnerships (NEEP), and Southeast Energy Efficiency Alliance (SEEA). The findings can be used to inform utilities, state and local government agencies, and other stakeholders in their future energy efficiency program considerations. While the findings in this report focus on ASHP, HPWHs, and envelope measures for existing residential homes and buildings, other technologies for saving energy from heating and cooling are often offered by efficiency programs.[7] This report does not provide a complete picture of all residential utility programs within the Midwest, Northeast, and Southeast or across the United States; rather, the conclusions are derived from a robust and varied sample size.

This report distills key findings and learnings by program approach and regional characteristics to be used by utilities or other stakeholders to tailor and strengthen their own programs to meet specific success metrics. While utilities define success in energy efficiency programs differently, the underlying factors that influence success of programs covered in this report offer guidance that can be applied by utilities, government agencies, and other stakeholders.

MEEA, NEEP, and SEEA contributed to this report's development, which includes regional metrics, goals, findings, and recommendations from discussions with investor-owned, public, and cooperative electric and gas utilities and other administrators of energy efficiency programs. The distribution of utility types and programs included in the research varies by region and does not encompass all energy efficiency programs in these regions, as findings are intended to be directional and informational rather than comprehensive. The conclusions derived from the data and information only represent findings and practices from the specific utilities interviewed by the REEOs based on interviews or meetings. This report summarizes available regional metrics, goals, and key findings to support the assessment of the current market status and barriers, program approach challenges and opportunities, and recommendations to support achieving defined program objectives.

1.2 Guidehouse Overview

Guidehouse leverages a deep understanding of energy efficiency programs and available advanced building technologies, tools, and information in the market today to provide technical assistance and program implementation. Guidehouse provided technical and strategic support to co-develop this report with the REEOs, working with

[7] Other relevant solutions included dual-fuel and ground source heat pumps. These technologies are discussed in greater detail in 5.2 Alternative Heating and Cooling Technology Options.

each team to develop market potential goals and metrics for each region. Guidehouse is a leading global provider of consulting services to the public and commercial markets with broad capabilities in management, technology, and risk consulting.

1.3 Regional Energy Efficiency Organizations Overview

1.3.1 Midwest Energy Efficiency Alliance (MEEA)

MEEA is a collaborative network of academic, research, advocacy, community-based organizations, energy efficiency related businesses, governments, and utilities promoting energy efficiency to optimize energy generation, reduce consumption, create jobs, and decrease carbon emissions in all Midwest communities. MEEA oversees a 13-state region that includes Ohio, Kentucky, Michigan, Indiana, Illinois, Missouri, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, and Kansas.[8] More information can be found at https://www.mwalliance.org/.

1.3.2 Northeast Energy Efficiency Partnerships (NEEP)

NEEP is a regional nonprofit that works to accelerate energy efficiency, electrification, and grid flexibility in the building sector as a core strategy to reduce climate pollution and build an affordable, sustainable, and resilient energy future. NEEP works with utility and energy efficiency partners in Connecticut, the District of Columbia, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, West Virginia, and Vermont. More information can be found at https://neep.org/.

1.3.3 Southeast Energy Efficiency Alliance (SEEA)

SEEA promotes energy efficiency as a catalyst for economic growth, workforce development, and energy security across 12 states that include Alabama, Arkansas, Florida, Georgia, Hawaii, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. More information can be found at https://www.seealliance.org/.

2 Data Collection Overview

2.1 Data Collection Methodology

MEEA, NEEP, and SEEA worked with regional electric and gas utility partners, energy-efficiency program administrators, manufacturers, distributors, and other stakeholders to conduct interviews and collect open-source data on residential rebate programs from 2023 - 2025. This report summarizes this data and provides technical and strategic framing.

[8] MEEA interviewed utilities with coverage in Kentucky. Kentucky is part of both MEEA and SEEA territories.

2.2 Key Data and Information

Quantitative metrics and qualitative information captured on residential utility heat pump, heat pump water heater, and envelope rebate programs were reviewed for 63 energy efficiency program administrators in 33 states and the District of Columbia.[9] The call out box to the right summarizes the key data and information collected. Figure 1 highlights the states and the customer population served by state for each utility and state program administrator included in this report.

In the Midwest, MEEA collected information from 31 program administrators (including one state-administered program) encompassing approximately 53% of residential electric utility customers in the region.

In the Northeast, NEEP interviewed 19 program administrators (including eight state-administered programs) encompassing approximately 85% of residential utility customers in the region.

In the Southeast, SEEA interviewed 13 program administrators encompassing approximately 43% of residential utility customers across nine states.

The information collected for programs across the Midwest, Northeast, and Southeast provides regional and state-level insights that can inform program design and stakeholder engagement strategies.

Key data and information collected:

- Number of projects by program type
- Program participation rate
- Percentage of heating equipment installed
- Percentage of cooling equipment installed
- Program design
- Definitions of program success
- Rebate incentive levels
- Contractor engagement and training strategy
- Manufacturer/distributor engagement strategy
- Customer engagement strategy

[9] Energy efficiency program administrator is the general term to describe utility and state-administered programs. The type of program administrator is specified where possible in the report.

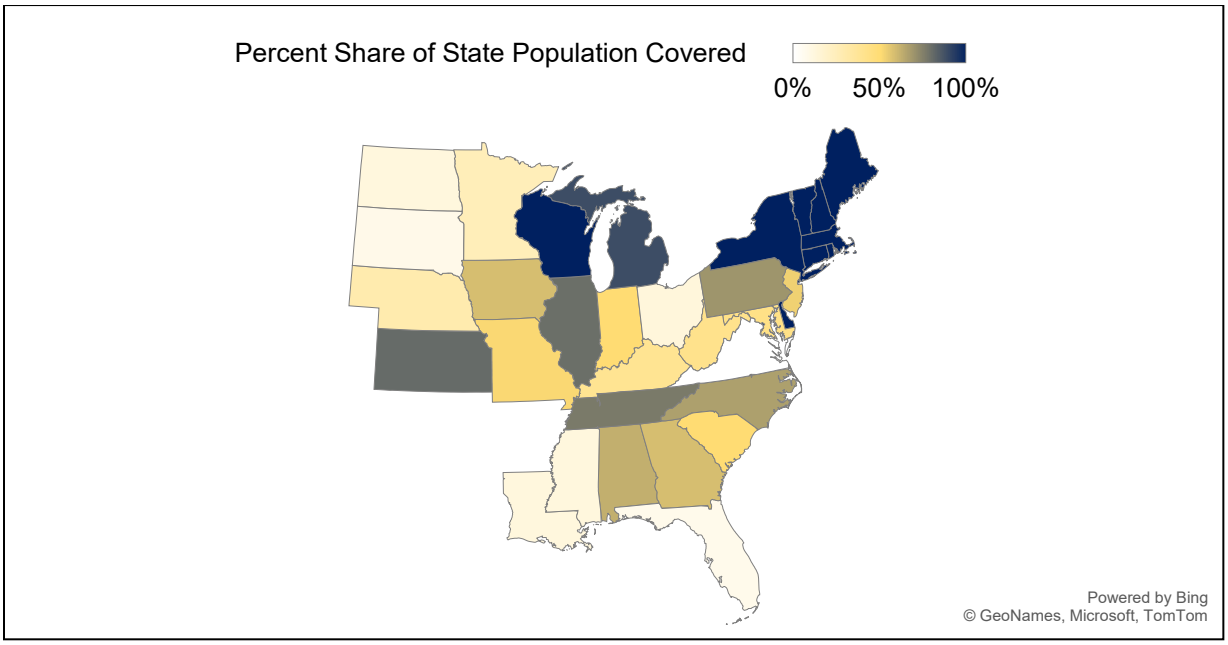

Figure 1. Customer population coverage by state for utility and state program administrators interviewed

Data Gaps: Each REEO focused on specific technologies when gathering data, as summarized in Table 1 below. Additionally, each region had gaps in the quantitative data available for evaluation. These gaps illustrated areas where future data collection can glean additional insights or stakeholders can work together to support greater understanding of program design. Installation data, such as number of projects or equipment details, was sparse, and where present, it was not consistently disaggregated in a way that allowed analysis of the energy efficiency measure. Additionally, envelope measure installation data was either missing or not separated by technology type. Comparatively, heat pump data was more likely to be found disaggregated by heat pump type (ASHP, GSHP, and mini-split). Another area with limited data identified by utilities was installation and equipment costs. Understanding equipment installations by region was highlighted as an area for future work of interest by the REEOs on behalf of their members.

Table 2. Data Availability by Region for Report

Technology	Midwest	Northeast	Southeast
ASHP	✓	✓	
HPWH	✓		✓
Envelope Measures	✓	✓	✓

2.2.1 Data Considerations:

- The data and information analyzed in this report and its conclusions do not reflect the complete landscape of utility programs in a state. The conclusions provide

insights into utility program strategies based on how an individual utility defined success, which varied across utilities.

- The utility program information provides a snapshot in time based on 2024 residential heat pump, HPWH, and envelope programs. Utility program offerings and associated rebate amounts can change each year.
- The same utility may offer similar ASHP, HPWH, or envelope programs across state lines. Due to variations in these programs by state, a program is counted separately for each state in which a utility offers the program.
- Utilities that provide whole home programs or require certain envelope measures be conducted concurrently did not track installation data for individual measures. Thus, the installation data for envelope upgrades often cannot specify the type of measure completed.
- Utilities in different regions have different program reporting requirements, procedures, and objectives. This is due to regulatory environments, which impact the experience, level of interest, and flexibility in program administration for ASHP, HPWH, and building envelope rebates.

3 Analysis Methodology

This report first describes utility program objectives, policy and regulatory environments, and electricity and gas price trends. Next, this report presents a regional overview on the number of programs, rebate trends, shared challenges, and common program design approaches. National sales data and price trends are provided for ASHPs and HPWHs to further add context to these regional overviews. Common utility engagement strategies for contractors, manufacturers, distributors, and customers are discussed and analyzed. A brief analysis of income-qualified and multifamily programs is conducted where program information is available. The report concludes with common utility program approaches and strategies that can lead to strong stakeholder engagement or achievement of other self-defined metrics of success.

Regional and state regulatory summaries provide context to the metrics captured and shared by program administrators because these external factors impact the types of programs utilities provide. These include state laws, regulations, and public utility commission requirements. Quantitative data on utility program installations for ASHP, HPWH, and envelope measures is analyzed to identify trends in the current state of programs in each region, and insights on shared challenges and viable solutions since the data was incomplete. Statistically significant conclusions cannot be drawn from the quantitative installation data presented in this report. The key findings extracted from the utility interviews and data are highlighted when there are common practices or when a unique strategy is implemented by a utility that helped it achieve its objectives.

4 Overview of Regional Characteristics

Utility energy efficiency program approaches and data collection are influenced by the regulatory and economic trends of the service territory. These include local objectives for energy efficiency programs, state utility regulations, state or regional energy efficiency goals where applicable, regional relative fuel prices, and accessibility of energy sources. This section summarizes the landscapes in which the programs covered in this report operate to support comparison across program designs and outcomes in different jurisdictions.

4.1 Regional Program Objectives

4.1.1 Midwest

Cost-effectiveness for energy savings and customer and contractor engagement are common objectives across the 31 ASHP, HPWH, and envelope programs in the Midwest. Utilities seek to implement cost-effective programs that are within budget and provide the correct rebate amounts to encourage customer participation. Many programs measure energy savings in kilowatt hours (kWh) and therms. Program administrators prioritize understanding customer satisfaction and simplifying program designs to make it easier for customers and contractors to take advantage of energy efficiency program benefits. Educating customers and contractors on program offerings and equipment or weatherization options, training contractors on proper equipment sizing and installation, and quality control measures are also priorities that utilities seek to address to achieve program goals. A secondary objective of these programs involves cultivating ecosystems and contractor bases to support new highly efficient technologies. Furthermore, many programs seek to align with relevant state energy policies and regulatory frameworks while helping customers reduce bill impacts.

4.1.2 Northeast

Utility rebate programs in the Northeast aim to promote the adoption of energy-efficient products and practices. Many programs operate in states committed to increasing the uptake of ASHPs through the Accelerating the Transition to Zero-Emission Residential Buildings Memorandum of Understanding (MOU) in 2024. As a part of this MOU, six jurisdictions in the Northeast (Maine, Massachusetts, Maryland, New Jersey, New York, Rhode Island) agreed to work toward heat pump sales making up 65% of residential heating, air conditioning, and water heating sales by 2030 and 90% by 2040.

4.1.3 Southeast

Utility programs in the Southeast set objectives related to the number of participants, number of homes, and kilowatt hour savings. Many investor-owned utilities (IOUs) focus on demand side management to offset peak demand and have incorporated cost-effectiveness tests, such as the utility cost test. Some utilities' goals to reduce peak demand include reducing winter demand and saving two million kilowatt hours of electricity annually. Positive customer experience and lowering electricity bills for low-income neighborhoods are also important priorities for these utilities.

4.2 Regional Regulatory Trends

Each region covered has a unique regulatory environment that influences specific program designs. The regulatory environment tends to be similar across states in the same region (e.g., many states in the Northeast have adopted state-wide programs, while Midwest and Southeast states often utilize integrated resource planning). While most states have no explicit fuel switching policy, a few midwestern and southeastern states have regulations that do not allow program administrators to support switching between regulated sources, i.e., switching from natural gas fired equipment to electric powered equipment or vice versa. Furthermore, the Southeast regulatory environment is more disparate with a few large, state utilities and IOUs subject to state regulations, and many smaller locally owned utilities subject to different regulations.

The analysis focused on seven key trends to demonstrate which regulations influenced energy efficiency programs in each region. The categories of regulatory trends include 1) integrated resource plans, 2) state or regional technical reference manual (TRM), 3) energy efficiency resource standards (EERS), 4) state policy on fuel switching, 5) spending caps, 6) regulations for utility recuperation of investments into energy efficiency programs (either fixed cost, loss revenue, or performance incentives), and 7) state-administered energy efficiency programs. These criteria revealed the following:

Integrated Resource Plan (IRP): An IRP is a long-term strategic roadmap that utilities use to meet future energy demand in the most cost-effective and reliable way.

State/Regional Technical Reference Manual (TRM): A state or regional TRM provides utilities with a standard resource to plan and evaluate their energy efficiency programs for expected energy savings and assumptions to calculate estimated savings. This resource provides consistency for program implementors and improves transparency and accountability in portfolios.

Energy Efficiency Resource Standards (EERS): EERS require or request utilities to participate in target reductions in customer energy use. These standards enable utilities to voluntarily seek approval for efficiency plans on a utility or case-by-case basis. The standards apply to specific utility types, such as electric or gas IOUs, depending on the state.

Fuel Switching Regulations: Fuel switching allowances or restrictions impact whether and how utilities are allowed to engage gas customers to install electric technologies such as ASHPs and HPWHs.

Spending Caps: Some states limit how much utilities can spend on energy efficiency programs.

Recuperating Energy Efficiency (EE) Investments: States often regulate how utilities can recuperate their investments in energy efficiency through ratepayer charges. State policies typically allow fixed cost recuperation of utility investments, while some states allow performance bonuses to utilities that exceed energy savings targets or to recover revenue when they sell less energy than planned. Investment recuperation offers a

business incentive providing utilities with financial stability and lowering risk premiums to conduct pilots and experiment with adding or adjusting program offerings.

State-Administered Energy Efficiency Program: The existence of a state-administered energy efficiency program centralizes program offerings across a state and leads to consistent program offerings and changes across the state when the program administrator adjusts rebate offerings.

4.2.1 Midwest

The analysis for this report found that the policy and regulatory environments among the 31 midwestern utility programs reviewed varies slightly across states as shown in Table 2. Despite policy and regulation variations, many midwestern program administrators agree on the need to keep electricity costs from rising for customers amidst efforts to improve energy efficiency.

Most midwestern states have an IRP or similar process, a technical reference manual (TRM) updated regularly, and a method for utilities to recuperate investments in energy efficiency programs. Some states, such as Illinois, Iowa, Michigan, Minnesota, and Wisconsin, have EERS. Illinois, Michigan, Minnesota, and Wisconsin allow fuel switching, while Kansas and Missouri explicitly ban it. One state has a state-wide energy efficiency program. The regulatory environment impacts energy efficiency program administration in terms of total program spend and target customer, leading to some states imposing spending caps.

Table 3. Midwest Regulatory Trends

State	IRP or Similar	State or Regional TRM	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide Program
IA	No	Yes	Yes	No policy	Yes	Yes	No
IL	Yes	Yes	Yes	Allowed	Yes	Yes	No
IN	Yes	Yes	No	No policy	No	Yes	No
KS	Yes	No	No	Prohibited	No	Yes	No
KY	Yes	No	No	No policy	No	Yes	No
MI	Yes	Yes	Yes	Allowed	No	Yes	No
MN	Yes	Yes	Yes	Allowed	Yes	Yes	No
MO	Yes	Yes	No	Prohibited	No	Yes	No
ND	Yes	No	No	No policy	No	No	No
NE	Yes	No	No	No policy	No	N/A	No
OH	Yes	Yes	No	No policy	No	No	No

State	IRP or Similar	State or Regional TRM	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide Program
SD	Yes	No	No	No policy	No	Yes	No
WI	Yes	Yes	Yes	Allowed	No	Yes	Yes

4.2.2 Northeast

Regulations varied across the jurisdictions of the programs reviewed in the Northeast as well, as summarized in Table 4. In most northeastern states, fuel switching within heat pump programs is not prohibited and utilities are allowed to recuperate investments on energy efficiency programs. Massachusetts restricts electric utilities from offering incentives to customers to switch from natural gas equipment in some localities, and Maryland only allows heat pumps for existing electric heating equipment or replacements where there is no existing heating system. West Virginia only allows heat pumps to replace non-regulated existing fuel systems.

IRPs and EERS vary widely in the Northeast, but every state has access to a state-wide or regional TRM. Two states and Washington D.C. use “efficiency utilities” to administer their ratepayer funded energy efficiency programs. Electric and gas utility companies administer the remaining energy efficiency programs.

Six northeastern states (Maine, Maryland, Massachusetts, New Jersey, New York, and Rhode Island) have committed to a regional goal for heat pumps to make up at least 65% of residential heating, air conditioning, and water heating shipments by 2030 and 90% by 2040 (NESCAUM 2024). Annual sales of ASHPs in the Northeast region increased 12 percent, from approximately 408,000 to 458,000 units from 2021 to 2023, despite a decrease in national HVAC sales. The ASHP market share by units sold has grown from 25 percent to 32 percent in the Northeast from 2021 to 2023, compared to 31 percent in the national market. The region must roughly double the market penetration of ASHPs from 2023 to 2030 to reach the 65 percent market penetration target and roughly triple market penetration to reach the 2040 target of 90 percent.

Table 4. Northeast Regulatory Trends

State	IRP or Similar	State or Regional TRM	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide Program
CT	Yes	Yes	Yes	Allowed	No	Yes	Yes
DC	No	Yes	Yes	Allowed	No	Yes	Yes
DE	Yes	Yes	No	No policy	No	Yes	Yes

State	IRP or Similar	State or Regional TRM	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide Program
MA	Yes	Yes	No	Some restrictions	Yes	Yes	Yes
MD	No	Yes	No	Electric or no heat	No	Yes	No
ME	No	Yes	Yes	Allowed	Yes	Yes	Yes
NH	Yes	Yes	Yes	No policy	No	Yes	Yes
NJ	No	Yes	No	Allowed	No	Yes	No
NY	No	Yes	No	Allowed	No	Yes	No
PA	Yes	Yes	Yes	Allowed	Yes	Yes	No
RI	No	Yes	Yes	Some restrictions	No	Yes	Yes
VT	Yes	Yes	No	Allowed	No	Yes	Yes
WV	No	Yes	No	Non-regulated fuels	No	No	Yes

4.2.3 Southeast

Many utilities in the Southeast are smaller with cooperative or other ownership structures that are not subject to the state level regulations summarized below in Table 5. However, most states have a larger utility with an ownership structure, such as an investor-owned utility, which is subject to the regulations summarized.

All 11 southeastern states have formal IRPs or similar processes. None impose spending caps on utility energy efficiency programs, and all allow utilities to recuperate investments in energy efficiency programs. There is one state-wide energy efficiency program in the Southeast. Fuel switching is discouraged more in the Southeast compared to the Midwest and Northeast, with four states prohibiting or discouraging it. Only Arkansas has a state TRM in the Southeast, and Arkansas and Virginia have state EERS for utilities.

Table 5. Southeast Regulatory Trends*

State	IRP or Similar	State or Regional TRM?	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide program
AL	Yes	No	No	No policy	No	Yes	No
AR	Yes	Yes	Yes	Prohibited/ Discouraged	No	Yes	No

State	IRP or Similar	State or Regional TRM?	EERS	Fuel Switching Regulations	Spending Cap	Recuperate EE Investment	State-wide program
GA	Yes	No	No	No policy	No	Yes	No
FL	Yes	No	No	No policy	No	Yes	No
KY	Yes	No	No	No policy	No	Yes	No
LA	Yes	No	No	Prohibited	No	Yes	Yes
MS	Yes	No	No	No policy	No	Yes	No
NC	Yes	No	No	No policy	No	Yes	No
SC	Yes	No	No	Prohibited/ Discouraged	No	Yes	No
TN	Yes	No	No	Allowed	No	Yes	No
VA	Yes	No	Yes	Prohibited	No	Yes	No

* Many southeastern utilities may not be subject to these state level regulations.

4.3 Regional Fuel Price Trends

Fuel and electricity prices vary across regions, impacting the cost savings associated with energy efficiency measures, and therefore customer interest and adoption of ASHP, HPWH, and building envelope solutions. Figure 2 and Figure 3 depict average electricity and gas prices from 2020 to 2024 across the Midwest, Northeast, and South.[10] This data illustrates a steady increase in electricity and gas prices. The difference in these prices can influence customer interest and rebate amounts for high efficiency equipment. For instance, while the Northeast has the highest electric prices, it has the second highest gas prices which could make electric heating less appealing. The impact of these prices is dependent on the specific characteristics of a jurisdiction, including average home size, type of existing heating and cooling systems, and the average state of existing building envelopes.

Average regional electricity prices in the Midwest and Southern regions are roughly the same and follow a similar increase (U.S. Bureau of Labor Statistics). Prices in the Northeast maintain higher levels compared to the other two regions. For natural gas, the

[10] The Northeast includes Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Midwest includes Illinois, Iowa, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The South includes Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Louisiana, Kentucky, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. The regional data is based on census divisions, which includes states that were included in this report.

South has higher natural gas prices per therm, followed by the Northeast, and then the Midwest.

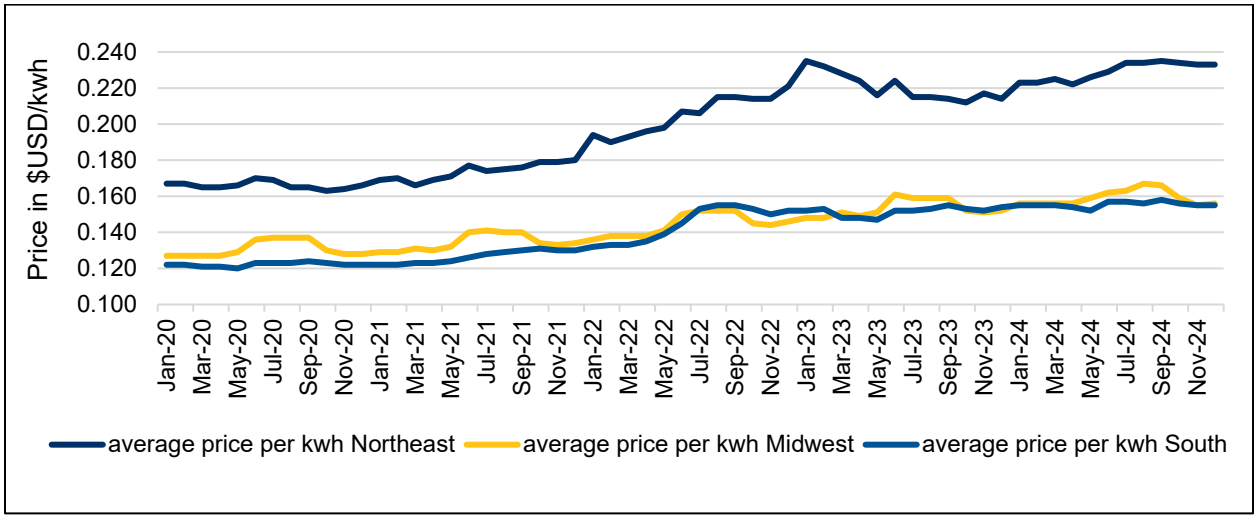

Figure 22. Average electricity price by region in dollars per kwh (2020-2024)

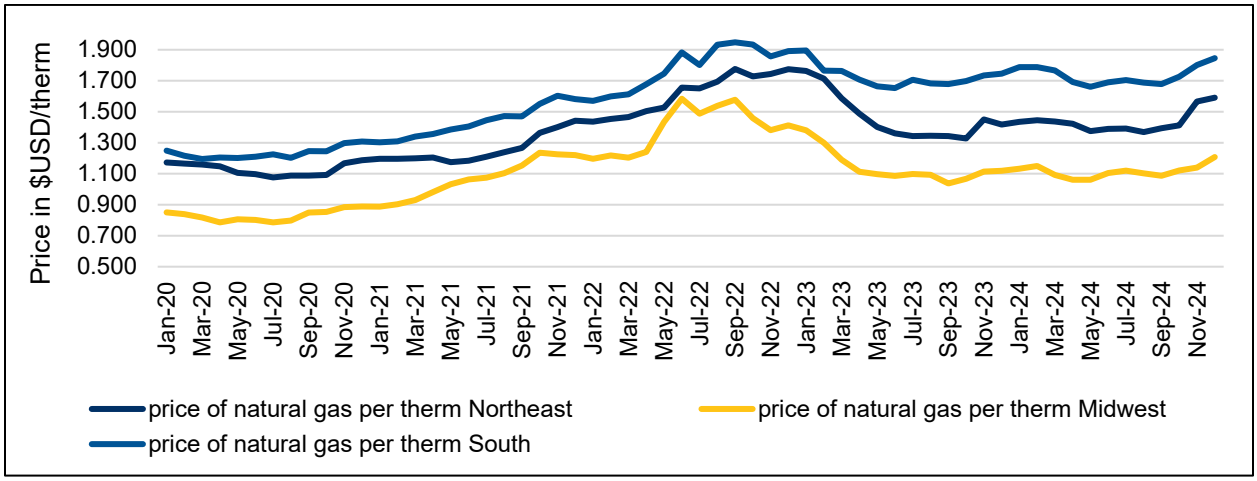

Figure 33. Utility (piped) gas price by region in dollars per therm (2020-2024)

The average Midwest home in 2020 used natural gas as a fuel source for space and water heating more than a home in the Northeast and Southeast (U.S. Energy Information Administration 2022) (Figure 4, Figure 5). Comparatively, the average Southeast home uses electricity the most for space and water heating. Propane as a source of space and water heating is not common (less than 10%) across the three regions. Opportunity exists for ASHPs in all three regions given that at least 20% of homes use electricity for space heating. There is also a significant opportunity for HPWHs in the Southeast given that 69% of homes on average already use electricity as a fuel source for water heating.

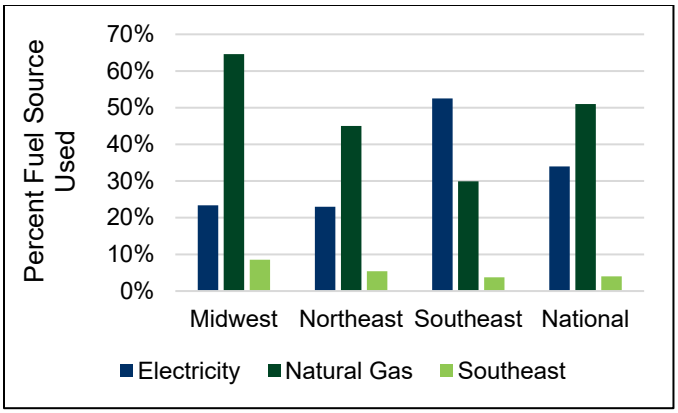

Figure 4. Average homes' fuel source by region used for space heating (2020[11])

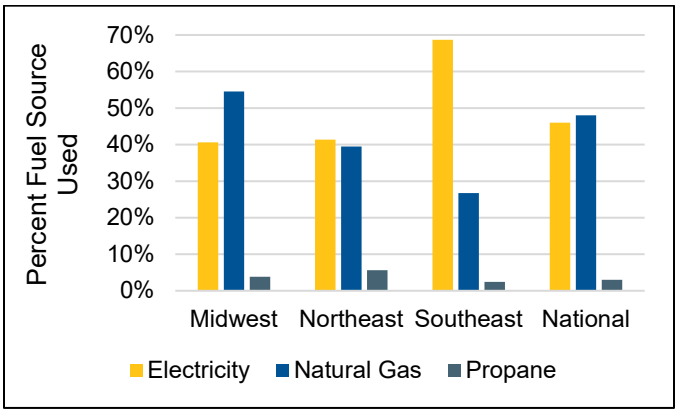

Figure 5. Average homes' fuel source by region used for water heating (2020[12])

5 ASHP Program Findings

The following section provides context for ASHP programs with national data, discusses other heating and cooling technology options, and discusses Midwest and Northeast program approaches to ASHP measures.

5.1 National Context for Regional Findings

ASHPs are growing as a solution to meet residential heating and cooling needs, either by supplementing or replacing existing systems such as natural gas furnaces. Since ASHPs can be used alongside existing systems, it is not always a direct replacement. Approximately 3.6 million ASHPs were shipped to customers in 2023 compared to approximately 3 million gas furnaces (AHRI 2025).[13] ASHPs overtook gas furnace sales

[11] The states counted for each region correspond to the REEOs' coverage.
[12] The states counted for each region correspond to the REEOs' coverage.
[13] Furnace shipments are not 100% analogous as 1) ASHPs included both ducted and ductless units and multiple ductless units may be purchased for a home switching from a fossil fuel boiler or furnace, 2) ASHPs may be added in addition to central furnaces for providing heating/cooling to extra spaces within homes (e.g., attics, basements, additions). However, it is a useful indicator.

in 2021 for the first time and, despite the slight drop for both in 2023, continued to exceed gas furnaces. About half of U.S. homes used natural gas heating equipment (62.7 million out of 123.5 million homes), which includes central warm-air furnaces, steam or hot water systems, built-in room heaters, and other natural gas heating equipment (U.S. Energy Information Administration 2022) (Figure 6). In comparison, about one-third of U.S. homes relied on electric heating (42.57 million out of 123.5 million homes). Heat pumps accounted for the largest electric heating equipment source among homes heated with electricity (approximately 16 million homes).

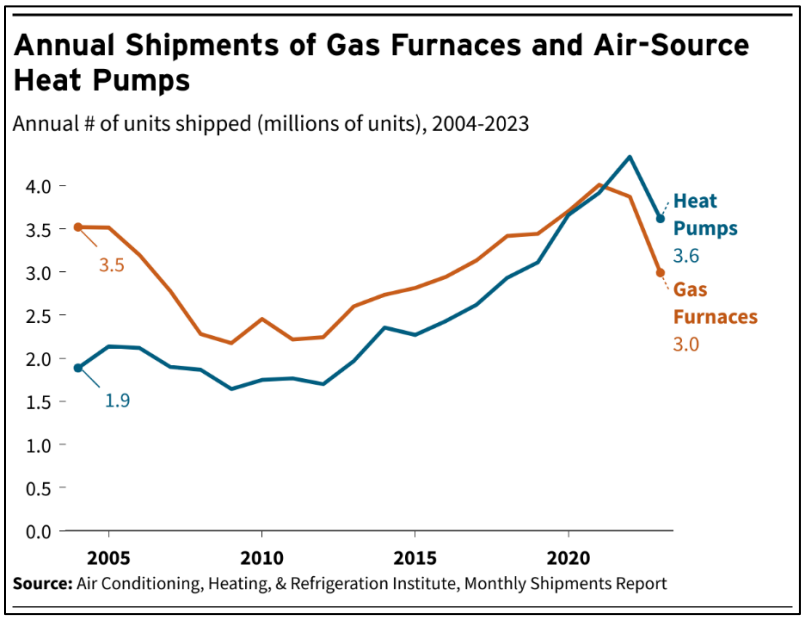

Figure 6. Annual shipments of gas furnaces and air source heat pumps[14]

Average equipment and installation costs for ASHPs, excluding add-ons and duct work, range from $4,000 to $12,000 depending on home size and unit capacity (Hazen 2024). Prices for heat pump installations vary by region and specific technology type (McCabe 2024). Whole-home ASHP systems, both centrally ducted and ductless, cost $20,000 on average to install in the Northeast. Centrally ducted heat pumps with a furnace (commonly referred to as dual-fuel or hybrid) cost between $18,000 and $20,000 to install on average. Single-zone ductless systems cost $7,500 on average in the Northeast. All ASHP systems range in cost due to difficulty or ease of installation, equipment size, whether electrical upgrades are needed, and if ductwork modifications are necessary. Price increases in the Northeast are attributed to several factors, including higher labor and equipment costs.

5.2 Alternative Heating and Cooling Technology Options

While this report focuses on ASHPs, there are an array of heating and cooling options for customers, such as geothermal heat pumps, dual fuel heat pumps, absorption heat

[14] Image Source: https://rmi.org/insight/tracking-the-heat-pump-water-heater-market-in-the-united-states/

pumps (gas-fired), and gas and electric furnaces. Many utilities in the Midwest and Northeast regions have conducted pilots for geothermal or ground source heat pump (GSHP) rebates and some states have created GSHP rebate programs (e.g., 27 GSHP rebate programs implemented in the Midwest). Utilities offering GSHP rebates noted a decline in installations due to high equipment costs and space limitations. The average utility rebate for GSHPs in the Midwest ranged from $857 to $1,626 (the highest rebate amounts compared to other HVAC technology rebates offered by utilities). In the Northeast, utility GSHP incentives for single family homes ranged from $650 to $35,000 and only New Hampshire, Washington, D.C., and West Virginia did not have state or utility administered programs publicly advertised for GSHPs.

Barriers to dual-fuel heat pump implementation are similar to those of ASHPs, including customer unfamiliarity with the technology, cost, and unfavorable installation experiences (Kirszner 2023). Contractors are also unfamiliar with installing dual-fuel heat pumps and system installation can be too costly for the customer. Several Midwestern utilities have or are developing dual-fuel heat pump rebate programs to address these challenges. Some well-established programs noted that promoting customer choice and the ability to have both electric and gas heating led to higher program participation because it allayed customers' fears about having to give up their familiar natural gas furnace.

5.3 Summary of Midwest Program Approaches

Program approaches are analyzed for 34 ASHP rebate programs offered by 31 utility administrators. At least one utility in each Midwest state offers an ASHP rebate (Table 5). The average minimum and maximum rebates offered by utilities for ASHPs range from $475 to $929. Utilities in Minnesota offer the highest average ASHP rebate, between $1,000 and $1,250. As noted earlier, the installation cost for ASHPs can range depending on the type and characteristics of the home. For context, a $900 rebate on a $12,000 ASHP installation covers 7.5% of the cost.

Table 6. ASHP Programs and Average Minimum and Maximum Rebates Offered by Midwest Utilities by State [15,16]

State	Count of Analyzed ASHP programs	Total Utility Programs Reviewed in Data	Average Minimum Rebate	Average Maximum Rebate
IA	2	4	$413	$863
IL	3	4	$225	$802

[15] Program data is reflective of the utilities interviewed by MEEA and not reflective of all utility programs in the Midwest. Figure 1 presents details on the percent of customers covered by the utilities interviewed for the report in each region and state.
[16] Tables throughout this report will denote a "-" when data was not available. This may be because there was no program or because the data was not collected or provided by interviewed stakeholders.

State	Count of Analyzed ASHP programs	Total Utility Programs Reviewed in Data	Average Minimum Rebate	Average Maximum Rebate
IN	4	4	$244	$856
KS	1	1	$500	$1,000
KY	3	3	$350	$667
MI	7	7	$640	$1,180
MN	3	4	$1,000	$1,250
MO	4	4	$425	$925
ND	1	2	-	-
NE	3	4	$533	$1,000
OH	1	4	$700	$700
SD	1	2	-	-
WI	1	2	$300	$600
Total	**34**	**45**	**$475**	**$929**

ASHP installation data from programs for 11 of the 31 utility program administrators interviewed is not sufficient to provide statistically significant conclusions. Nonetheless, it shows a general trend of increasing ASHP installations as shown in Figure 7. Anecdotally, utilities mentioned concerns about rising equipment and installation costs leading to lower heat pump installations.

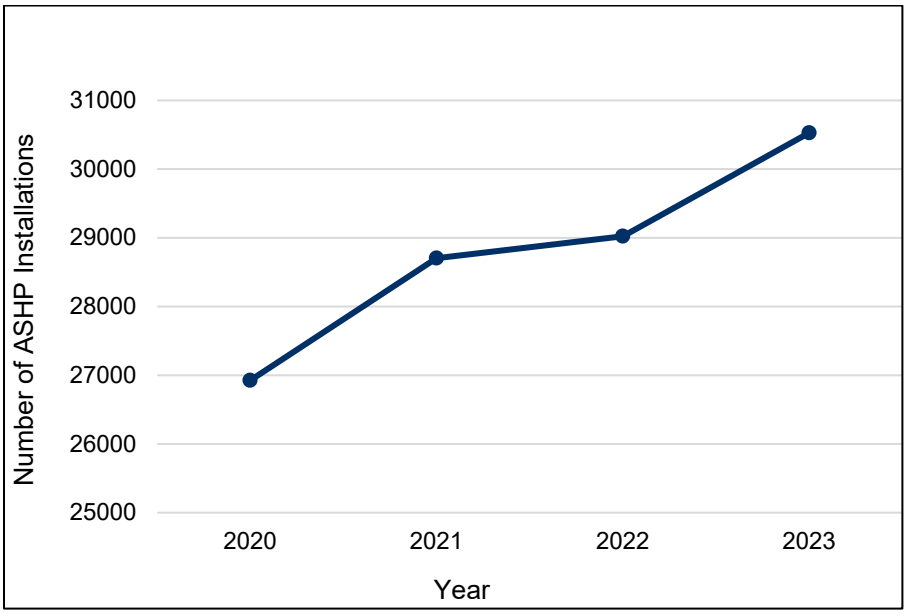

Figure 7. ASHP installations through utility programs[17]

Some of the midwestern utility heat pump programs analyzed require weatherization prior to heat pump installation. This approach can deter customers from selecting heat pumps, as they do not anticipate the added expense of the envelope upgrades when they are considering replacing aging or failed space conditioning equipment. However, these assessments are crucial to identifying other measures that may require an upgrade prior to heat pump installation. Oftentimes, insulation is upgraded as it creates large impact for lower cost and enables the heat pump to achieve maximum efficacy once installed.

Midwest-specific goals for heat pump rebate programs include 1) ensuring balanced rebate amounts and 2) incentivizing adoption.[18] To support these objectives, program administrators developed effective communication and feedback mechanisms with contractors, manufacturers, distributors, and customers.

5.3.1 Midwest Market Rate Program Analysis

Among the 34 ASHP programs in the Midwest, 24 ASHP programs employ a downstream approach and 8 employ a midstream approach.[19] One of these midstream ASHP programs offers rebate benefits to both upstream and midstream stakeholders (Figure 8, Figure 9).[20] The minimum and maximum rebate offerings for midstream programs tend to be lower than the minimum and maximum rebate offerings for downstream programs. The most common rebate amounts for midstream programs range from $225 to $375 per project, while for downstream programs, the most common rebates range from $500 to $1,000 per project.

[17] Based on limited data available on install numbers from 14 of the 31 utilities interviewed.
[18] A balanced rebate strategy sets rebate levels that drive the adoption of the ASHP (or other technology), balancing a rebate that is enough to influence purchasing decisions and remain cost-effective for the utility and ratepayer. A balanced rebate is optimized to avoid artificial price inflation or dependency on rebates to purchase high efficiency equipment. The program design requires alignment with similar rebates offered across a region or state.
[19] One program did not have enough information on the program stream.

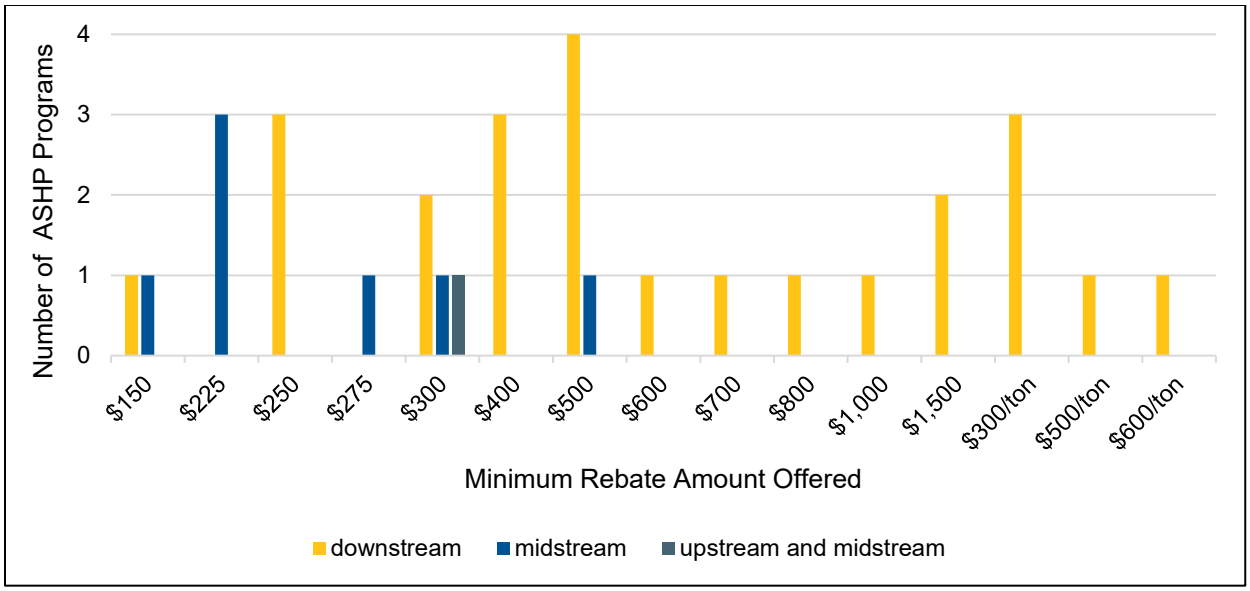

Figure 8. Frequency of downstream, midstream, and upstream programs by minimum rebate amount

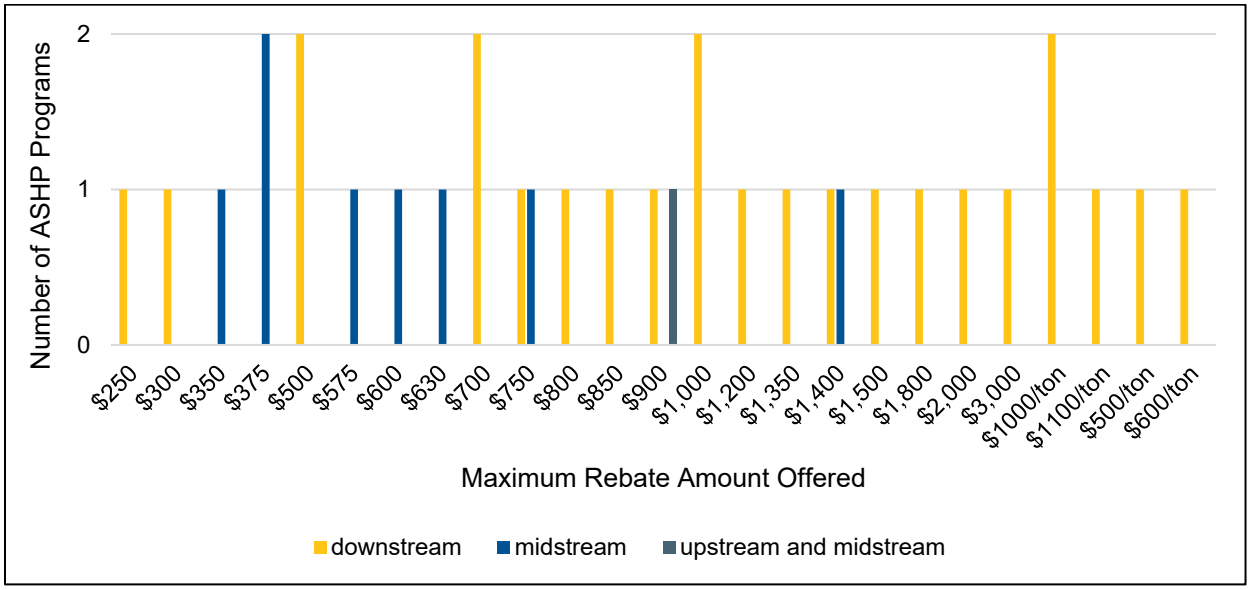

Figure 9. Frequency of downstream, midstream, and upstream programs by maximum rebate amount

Several utilities shifted from a downstream to a midstream approach due to regulatory requirements, program cost savings, and to simplify the program for contractors. Programs can better manage program administration when shifting to a midstream approach as these types of programs can impact a greater number of projects with fewer points of contact. Incentives tend to be lower because the focus is on completing a higher volume of projects. Encouraging sufficient stock of ASHP equipment is the main driver of other utilities considering this change in approach because it provides greater certainty on the supply of equipment.

Utilities that recently shifted from downstream to midstream incentive structures saw a substantial increase in program participation, as midstream incentives enable contractors and distributors to actively engage in promoting energy-efficient products. These utilities observed greater trade ally satisfaction, with contractors and distributors more willing to participate in rebate programs because they received direct financial benefits. The shift to a midstream approach improves awareness of and interest in program offerings among contractors, builders, and distributors, and can streamline processes for trade allies, leading to greater adoption of energy-efficient solutions.

Shifting from downstream to midstream or upstream incentive models also presents some challenges, such as significant administrative efforts and amendments to filed plans. Additionally, utilities with smaller service territories may not have a strong need for midstream or upstream incentives. For example, a utility serving a city surrounded by other service territories may be concerned about geographic limitations that make it difficult to ensure rebates are allocated exclusively to their customers when working through distributors. Another challenge is potential friction with distributors and contractors when transitioning from long-standing downstream programs to midstream models. Interviewed distributors did not like the additional administrative processing required on their part, while contractors disliked process changes. Finally, some utilities prefer downstream incentives to ensure equipment is installed and functional before releasing incentive funds, mitigating risks of unused or improperly installed equipment.

Program administrators should consider utility size, ownership structure, existing relationships with trade allies, and overall energy efficiency goals when deciding about a downstream, midstream, or upstream approach as these factors influence the success of a particular program design. For example, some programs can collaborate with a small group of contractors to collect and incorporate contractor feedback when adjusting rebate levels and making changes to program design elements. Smaller utilities can be more agile in their approach as another example, whereas larger utilities may benefit from scale but need to focus on managing a larger group of contractors.

5.3.1.1 Unit of Measure

Most ASHP programs provide incentives on a per project or per residence basis. Only five of the analyzed downstream ASHP programs offer “$/per ton” rebates rather than measuring the whole project or residence. In some instances, the “$/per ton” programs offer bonuses to customers that use a certified contractor and choose heat pumps subject to energy demand controls.

5.3.1.2 Challenges and Opportunities for Air Source Heat Pumps in the Midwest

Equipment durability and maintenance costs are challenges for ASHP programs. Manufacturers provide 10-year parts warranties; however, labor costs for repairs are high. While compressors used in ASHPs are designed for air conditioning units and expected to last 15-20 years, some contractors in the Midwest receive frequent requests to replace compressors or repair reverse valve issues in the summer. In this case these compressors in the ASHPs may be subject to increased usage or cycling due to climate or installation characteristics, resulting in faster burnout and higher

equipment degradation rates. Considering the environment when selecting equipment and installation in accordance with manufacturer instructions or other quality installation resources can reduce these issues.

Additional challenges with contractors include a lack of interest in rebate program participation due to unfamiliarity or resistance to the technology, hesitancy due to equipment upfront cost, and limited capacity to assist customers with rebate forms. Many contractors do not have experience explaining ASHP technology to customers and require training and support from utilities to build confidence and understanding to communicate with customers. Localized contractor shortages prevent busy contractors from engaging with utility training programs or finding time to learn about new technologies. Overcoming these challenges is necessary to ensure quality installations that meet customer and program performance expectations.[21]

Complicated rebate application processes can lead to some contractors helping customers complete required forms. Contractors who do not help customers submit rebate forms cite the following reasons: operational preferences, a cumbersome rebate application, or a perception that incentives were too low. Utilities can remedy difficult rebate application processes by adding a training manual or guide, simplifying the rebate form, digitizing the process, and providing regular status updates to contractors. In rare instances, utilities with ample resources have used energy advisors to fill out rebate forms for customers or field questions from contractors filling out rebate forms. Instant rebates applied through manufacturers and distributors in midstream approaches help reduce paperwork and delays for receipt of incentives. Strong contractor engagement and education/training on program offerings, incentives, and forms also enables increased uptake and interest in incentives.

5.3.2 Midwest Multifamily Program Analysis

Multifamily programs are offered by 18 of the 31 utility program administrators interviewed in the Midwest in 10 states. Of those programs, three programs offer heat pump rebates, six programs offer envelope upgrades, and nine programs offer both to multifamily buildings.

Programs report difficulty supporting ASHP installations for multifamily buildings. These buildings often required ductless ASHP systems based on existing hydronic equipment or systems with lower upfront costs which may not have met the TRM's efficiency levels for ASHPs. This decreases the rebate impact and eligibility. Some utilities saw success with focused multifamily programs for income-qualified customers with up to $7,500 in assistance for heat pumps.

[21] Quality installations are defined as installation practices contractors should use for HVAC technologies or envelope upgrades to increase the likelihood the technology or upgrade yields the expected energy performance and cost savings benefit for the customer. Typically, this involves following manufacturer instructions.

Many multifamily building owners typically have established relationships with contractors for HVAC who frequently promote familiar technologies rather than new technologies. Utilities can leverage existing strong relationships with property owners and provide advice on equipment upgrades that fit the needs of their building profile to proactively address potential future issues.

5.3.3 Midwest Strategies for Stakeholder Engagement

5.3.3.1 Contractor Engagement and Training

Utilities in the Midwest engage contractors through direct, in-person engagement, contractor networks, quality installation checks, and training. These utilities focus on engaging contractors for heat pump programs, and in doing so are able to glean insights for engaging contractors on envelope measures. Utilities can employ the following strategies to engage with contractors:

Direct Engagement: In-person engagement with contractors and trade allies is key to building trust, communicating program changes, collecting program feedback, and improving best practices. Direct interactions between utility staff and contractors provides utilities with useful feedback from contractors on program design and incentive levels, challenges with technology adoption, installation, costs, and recommendations for contractor training.

Contractor Networks: These networks serve as formal convening mechanisms to engage contractors performing heat pump and envelope improvements. Utilities can use contractor networks to collect feedback, conduct training, standardize installation practices, and promote programs. To join utility contractor networks, contractors must attend annual training on incentive programs and agree to program rules, quality assurance checks, and maintain a Building Performance Institute (BPI) certification. Once approved, contractors are listed on the utility's website. These contractor networks establish strong contractor-utility relationships and help utilities to understand the contractor challenges and considerations for heat pump and envelope programs. Contractor networks can inform incentive levels, program uptake, and user-friendly rebate forms.

Quality Installations Checks: Utilities can adopt a variety of approaches for conducting quality checks for heat pump and envelope installations to ensure contractors provide quality installations and employ best practices. Some utilities require contractors to pass a heat pump quality assessment prior to participation in rebate programs. Other utilities conduct heat pump installation inspections to confirm contractors follow best practices and provide feedback for continuous improvement. Quality audits are periodically conducted for contractors in the contractor network and if issues are consistently found (using the "three strikes" policy), contractors may be removed from the network. New contractors receive inspections for their first five projects to ensure quality installation.

Training: Utilities can hold in-person training, with varying levels of attendance depending on contractor interest and availability. Training provides information on

rebate programs and contractor topics of interest. Utilities can also provide certification training, such as BPI trainings, or mandate best practice training modules, including those provided by manufacturers, before contractors can participate in rebate programs.

These strategies benefited many midwestern utilities. For example, one midwestern IOU trained more than 500 contractors using online modules and required contractors to complete manufacturer and distributor trainings. However, several utilities faced staff limitations that hindered their ability to engage with contractors and provide training and quality checks. Utilities that did not have established quality assurance struggled with maintaining standardized quality installations, as only some contractors independently conduct pre- and post-installation audits.

5.3.3.2 Manufacturer and Distributor Engagement

Midwestern utilities have built strong local relationships with manufacturers and distributors to ensure product availability, assist in contractor education, and expand program outreach. Communication of product availability allows customers to take advantage of utility programs in their area based on the heat pump options available. Utilities offering midstream programs can collaborate with manufacturers and distributors to redesign and improve programs. Working with distributors to confirm a sufficient supply of heat pumps improves program effectiveness beyond contractor engagement. For example, conversations between utilities, manufacturers, and distributors on local sales can help a utility restructure its program from being based on outdoor units to ducted and non-ducted ASHP structures. Communication between the utilities, manufacturers, and distributors reduces confusion and increases understanding of any program changes. IOUs and municipal utilities noted that they are in discussions with manufacturers and distributors to bulk purchase heat pumps to reduce costs for contractors.

Engaging manufacturers enables updated and accurate information to be shared with contractors, and contractors prefer receiving the information directly from manufacturers. Utilities can share newsletters and send marketing representatives to distributors, who pass this information to key stakeholders in their network, expanding the utilities' outreach efforts. Local and industry networking events enable collaboration with similar programs around the country and the sharing of best practices.

Manufacturers play a crucial role in market education, but not all manufacturers embrace this role. Manufacturers can communicate the benefits and drawbacks of technologies to contractors, and how this information is communicated can bias customer choice. Strong collaboration between utilities and manufacturers to educate and engage contractors and customers can lead to increased cost savings for customers. For example, a utility working with manufacturers to co-market their products alongside available rebates easily enables customers to stack utility and manufacturer rebates to maximize savings for customers.

Utilities using a midstream approach realize benefits such as capturing a larger share of eligible heat pumps that quality for their programs. There are trade-offs with some distributors seeking higher incentives. A utility transitioning from a downstream rebate

program to a midstream rebate may face some resistance from distributors who feel the new program approach is more burdensome. The utility can meet with distributors regularly to capture and incorporate feedback to improve program design.

Utilities offering upstream approaches can benefit from close communication with manufacturers and contractors for HVAC systems to understand changes in refrigeration technology and safety measures to help inform program design. Incentivizing manufacturers enables manufacturers to provide contractor training and education and incentivizes contractors to promote and sell efficient systems. Contractors pass on some incentives to customers as discounts, leading to a flow down of incentives from upstream to downstream.

Maintaining effective communication with manufacturers and distributors leads to better utility program designs, outreach, and manufacturer and distributor relationships for midstream and upstream programs.

5.3.3.3 Customer Engagement

Customer engagement with single family homeowners and building owners leads to customer understanding of program offerings and program participation. Mailers included in utility bills and mass marketing such as digital campaigns, local radio and news, community events, and social media create awareness and engagement with utility programs. Home energy assessments relay information to customers about potential upgrades. Engagement with trade allies, published fact sheets, and customer testimonials inform customers of heat pump and envelope program offerings and potential results. While many programs expressed the importance of customer engagement in meeting program goals, it was noted that marketing is often a target when budgets are reduced.

Some utilities promote heat pumps directly and provide strategies to reduce costs, such as suggestions to seek quotes from multiple contractors. A focused approach can be employed to identify customers more likely to adopt heat pumps, using solar installation or electric vehicle ownership as indicators of interest in ASHP adoption. Customer engagement through post-install satisfaction surveys or contractor surveys identifies pain points in utility heat pump rebate programs. Customer engagement also helps utilities track increases in customer utility bills.

Programs aim to provide customers with information to make the right upgrade decision for their needs. Customer education includes energy assessments provided by assessors who inform customers of potential upgrades, information sharing through contractors, and customer portals where customers can see their usage data.

For those customers reluctant to adopt new technologies, leveraging experienced and trained contractors to speak candidly about the benefits and challenges of various heating technology options can increase program engagement and customer education.

5.4 Summary of Northeast Program Approaches

The Northeast region includes New England and Mid-Atlantic states. Northeast programs typically offer ducted and ductless ASHP equipment. Programs continue to offer solutions to partially heat homes and some are starting to require solutions sized to provide whole home heating. Hydronic heating systems are more common in the Northeast compared to other regions, and these systems can require separate ductwork to include a supplementary ASHP to replace heating needs where there is no existing ductwork or systems are designed to only address cooling needs.

HVAC sales decreased nationally from 2022 to 2023, while ASHP sales increased 12% in 2023 compared to 2021 in the Northeast. Sales in New England and New York steadily increased despite overall depressed market forces. The Northeast also saw increased market penetration of ASHPs from 25% in 2021 to 32% in 2023, with market penetration in New England estimated at 46% and in the Mid-Atlantic at 21%. The Mid-Atlantic region is a larger market based on population, so despite local differences, there is an opportunity to increase ASHP use based on high regional installation rates. Programs in the Northeast across five states focused their incentive programs on ASHPs for single family homes between 2018 and 2023 and saw increased participation, as shown in Table 7. Programs in the Mid-Atlantic are newer and have the potential to see an increase in participation similar to that in New England.

Table 7. Heat pump projects per year for five state-level market rate programs

State	2018	2019	2020	2021	2022	2023	Data Source
Vermont	4,600	-	~10,000	~10,000	~10,000	11,451	Link
New York	-	-	5,700	21,500	29,500	26,547	NYSERDA Clean Heat Annual Reports
Massachusetts	-	11,038	11,545	16,434	18,363	28,273	Link
Maine	-	-	12,765	28,247	30,258	32,752	Link
Connecticut	3,207	4,515	5,346	9,869	9,822	21,886	Link
ASHP, Ducted	*72*	*42*	*125*	*540*	*1,716*	*11,587*	
ASHP, Ductless	*3,119*	*4,450*	*5,168*	*9,174*	*7,869*	*9,867*	
GSHP	*16*	*23*	*53*	*155*	*237*	*432*	

5.4.1 Northeast Market Rate Program Analysis

In the Northeast, 33 utility rebate offerings are available across 12 states for residential air source heat pump installation in single family homes. Thirty of the 33 offerings fall under state or district wide program administrators. Northeast programs employ downstream approaches to target the customer, with two Mid-Atlantic programs offering additional bonuses for contractors. One program in the Northeast also employs a midstream approach. Figure 10 and Figure 11 highlight the number of programs offering

downstream approaches and where contractor bonuses were included by minimum and maximum rebate amounts.[22]

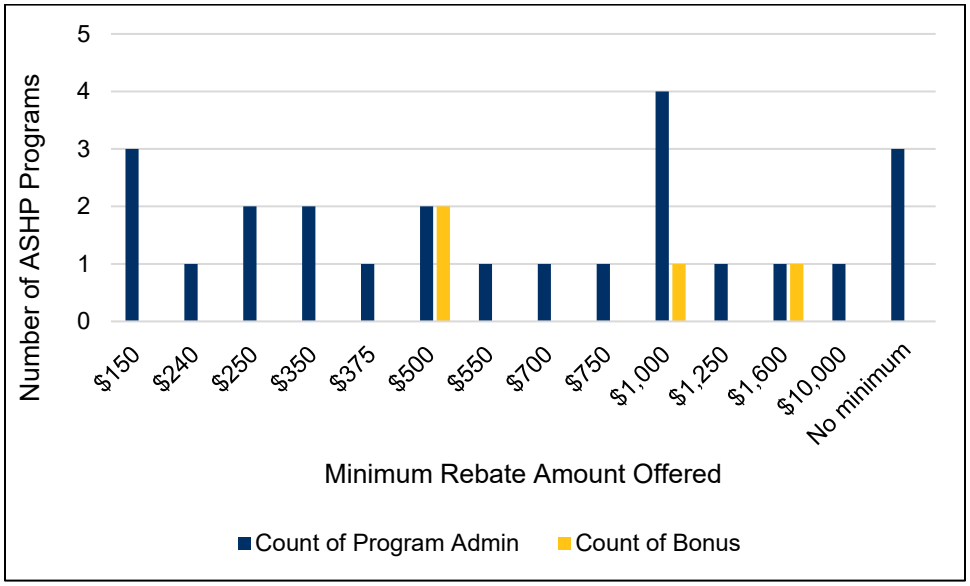

Figure 10. Count of programs and contractor incentives/bonuses by minimum rebate amount

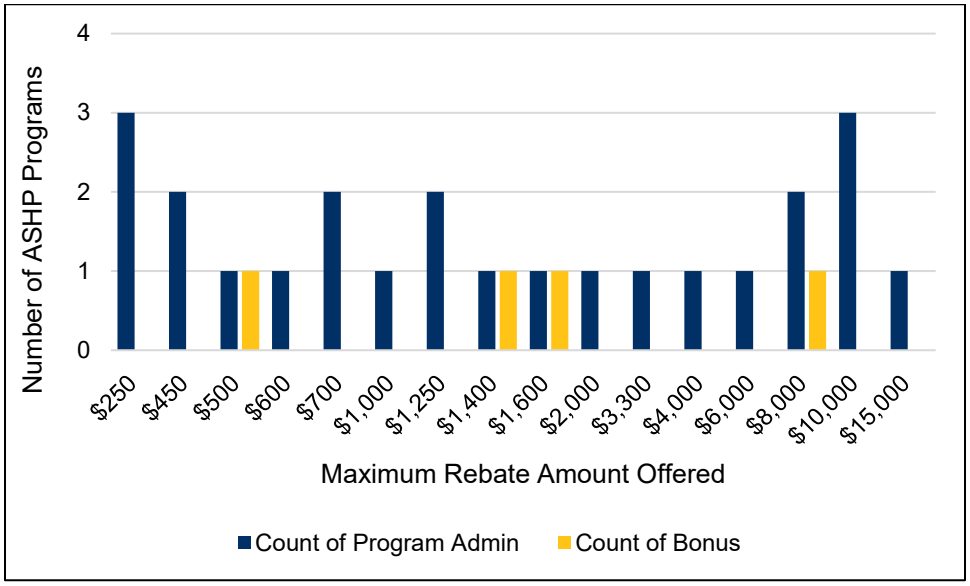

Figure 11. Count of programs and contractor incentives/bonuses by maximum rebate amount

5.4.1.1 Unit of Measure

Northeast ASHP programs offer rebates per ton of cooling (17 programs), per BTU and per ton of heating (four programs), per project or per residence (nine programs), and outdoor condenser (three programs) (Figure 12). Twelve offerings specify whole home

[22] Additional programs may offer contractor bonuses.

solutions, and four of these require decommissioning the existing HVAC system. Of the offerings that allow either partial or whole home solutions, six require integrated controls, and five offer a bonus for integrated controls.

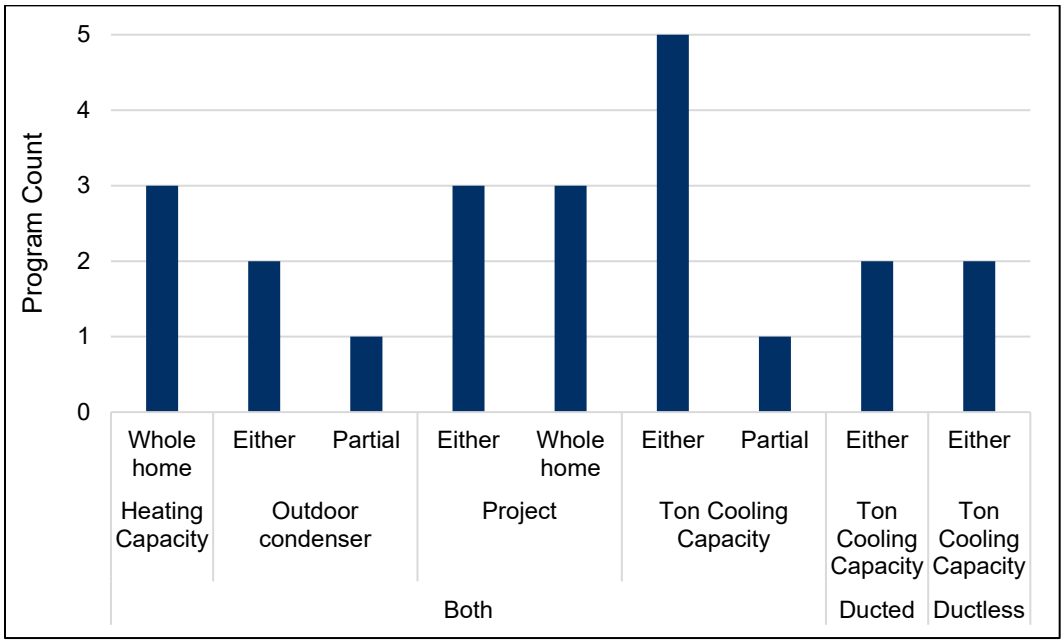

Figure 12. Program approaches for ASHP programs in the Northeast

All programs in the Northeast include another level of specificity in rebate offerings based on the ASHP type, differentiating between ducted and ductless ASHP systems. Two programs offer a separate incentive, depending on the type of ASHP installed, to account for differences in installation costs. In both cases, higher minimum and maximum rebates are offered for ducted systems due to higher installation costs. Both types of systems are used to address partial and whole home heating solutions across the region. The minimum and maximum rebate offered varies by program administrator, unit of measure, and whole versus partial home heating solutions as shown in Figure 13.[23]

[23] ASHP rebates offerings in the Northeast were categorized by whole-home, partial, or either (meaning customers could choose whole-home or partial home ASHP solutions).

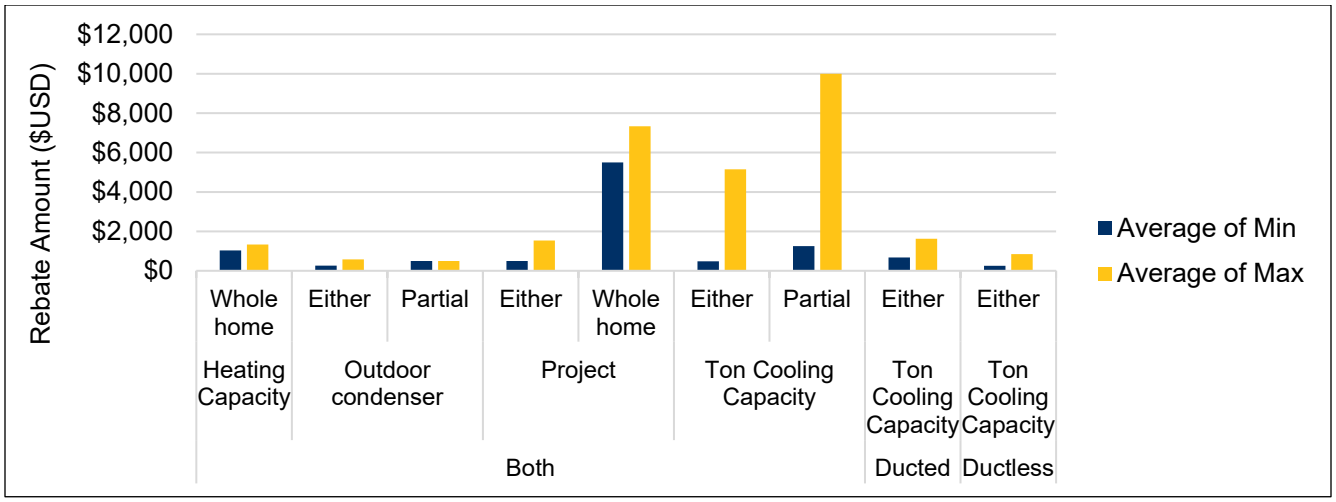

Figure 13. Average minimum and average maximum rebate in U.S. dollars by program approach across the Northeast based on NEEP summary data

Energy savings are measured by heating or cooling capacity by nine Northeast utility ASHP programs and by total cooling capacity by six programs. Per ton cooling capacity is the most common unit of measure for programs in the Northeast and has the highest maximum average rebates. It also has some of the widest range between minimum and maximum rebates. Cooling needs can vary significantly depending on the state, which impacts the measured savings. Additionally, cooling capacity, while more commonly understood, can be less accurate in determining the energy savings associated with an ASHP, especially if it is used for heating. Of these, five programs offer both partial and whole home solutions, and only one focuses solely on partial home heating solutions. Programs are starting to refine the measure of energy savings based on how much heating the ASHP system will displace. The average rebate for programs based on total cooling capacity that allows both partial and whole home solutions ranges from $480 to $5,150. There are three programs that use heating capacity and focus on whole home solutions. These programs are based in New York and New Jersey and have moved away from partial home solutions over time. The rebate amounts for these whole home heating capacity programs ranges from $500 to $1,600, with an average minimum rebate amount of $1,033 and an average maximum rebate amount of $1,333.

Increasing incentives based solely on increased heating or cooling capacity risks inaccurate sizing of installed equipment. While both are used as metrics for the rebate, cooling capacity is generally better understood by customers and contractors. However, using cooling capacity to determine the necessary size of a unit can lead to improper sizing for units that would be used for larger heating loads. Using heating capacity to size units most accurately identifies the low temperature capacity of particular units to reflect the equipment's capacity to meet higher or more extreme heating loads at lower outside temperatures. Larger incentives for larger equipment may inadvertently promote oversizing and result in increased customer costs and reduced efficiency. Training and quality assurance processes can help ensure proper sizing of ASHP systems.

Some program administrators in the Northeast shifted to per project or per residence unit of measure to avoid system oversizing due to a lack of evidence that partial heat pump installation enables states to reach their energy-reduction goals. Six programs use per project or per residence as the unit of measure to determine the rebate amount, and half of these programs allow either partial or whole home solutions with an average rebate range of $498 to $1,533, while the other half only allow for whole home heating solutions with an average rebate range of $5,500 to $7,333. Offering whole home heating solutions can lead to more assurance of realizing higher energy savings. Two of the program administrators who are focused on whole home heating solutions offer programs targeting partial heating solutions using different metrics. Programs utilizing a per project or per residence approach are most common, serving an estimated 40% of the regional population.[24] Per project or per residence units of measure offer simplicity for program administrators and remove motivations for contractors to oversize. However, this might motivate contractors to undersize or reduce quality to lower the initial price at the expense of higher operational costs. Also, large building owners can receive a lower incentive relative to the overall installation cost since they often require larger systems with higher installation costs. This may be counteracted by the increased savings associated with retrofitting a larger building, improving the cost/benefit assessment. Quality assurance, training, and offering tiered rebates based on building type or size can mitigate these risks.

Three northeastern utilities in the Mid-Atlantic region have program offerings using the size of the outdoor condenser of the corresponding heat pump system as the unit of measure to determine rebate amounts. This technique is similar to measuring per unit since it does not scale with size. Two utilities allow for whole home or partial heating load solutions with an average minimum rebate of $263 and an average maximum rebate of $575. One program only uses outdoor condenser size to measure savings on partial home heating solutions. That program administrator uses a per project unit of measure for projects that address whole home heating needs based on considerations such as oversizing and ensuring realization of savings.

5.4.1.2 Challenges and Opportunities for Air Source Heat Pumps in the Northeast

High incremental costs and operational costs relative to conventional heating equipment are two of the largest barriers to scaling the adoption of ASHPs. These cost barriers are due to the relatively low price of natural gas compared with electricity, rising electricity prices, and challenges comparing installation cost bids from different installers for different equipment. Some customers may have higher economic value propositions based on existing fuel and new construction. Additionally, eight programs in the Northeast offer bonuses for specified integrated controls to support systems that retain the existing fossil fuel system when adding a heat pump system. Verifying proper control setup and operation for dual-fuel systems is challenging as users can override control setpoints or original setpoint schedules may not be set to optimize energy

[24] Northeast Energy Efficiency Partnerships (NEEP) is expected to publish additional analysis specific to the Northeast in the near future and will be accessible via the following link: https://neep.org/resources.

savings. Programs can offer assurance to homeowners that the disparate systems (dual fuel or dual technology) can maintain temperature in very cold settings and operate as intended by supporting integrated controls, along with education and training on set up and use.

In the Northeast, the market for whole-home heat pumps (ducted and ductless) is relatively immature compared to the mature partial displacement ductless market in the same region. Programs offering economical whole home ASHP solutions present a strong value proposition to customers. There is an opportunity for partial displacement solutions to ease adoption of high efficiency solutions for certain consumers and contractors. Partial displacement solutions have a lower barrier for entry compared to whole home solutions due to similarity with existing cooling solutions and the ability of customers to keep existing heating or cooling systems. Sometimes, decommissioning of the existing HVAC system is required to provide an elevated level of assurance that energy-efficiency targets will be met. Decommissioning existing HVAC systems can be straightforward or can be considerably costly and complex, and thus this practice remains debated within the industry.

Whole-home ASHPs in new homes with lower electricity loads have lower installation costs, and therefore these customers can be targeted first for full adoption to heat pumps for whole home space heating. In retrofit applications, 44 to 64 percent of homes in the Northeast used a furnace for main heat, and centrally ducted inverter heat pumps offer a solution for this relatively untapped market. The most affordable models do not include inverters and use single or two-stage compressors and are limited in the amount of heating they can displace. Inverter-driven heat pumps can displace more heating and integrate beyond the centrally ducted zones of a home; however, they are more expensive.

5.4.2 Northeast Income Qualified Program Analysis

Ten northeastern utilities offer programs with an income-eligible component (Figure 14). Eight of the ten programs offer a bonus for low to moderate income (LMI) households, including an additional 20% to 40% of project costs. Only one program offers a bonus to LMI households if the existing fuel type is a delivered fuel (propane or oil), and another program covers the entire project cost for LMI households if households sign up for a solar energy program.

Income-eligible programs enable households to install ASHPs and reduce energy bills. Programs must consider instances where energy bills remain the same or increase, as may happen when fuel switching from gas. Additionally, the impact of income-eligible ASHP programs can be limited by administrative costs and barriers to participation. Programs in the Northeast have developed solutions to reduce the burden of navigating multiple programs and provide end-to-end facilitation for the customer. Community based organizations play an invaluable role in enabling utilities to reach and support lower-income residents.

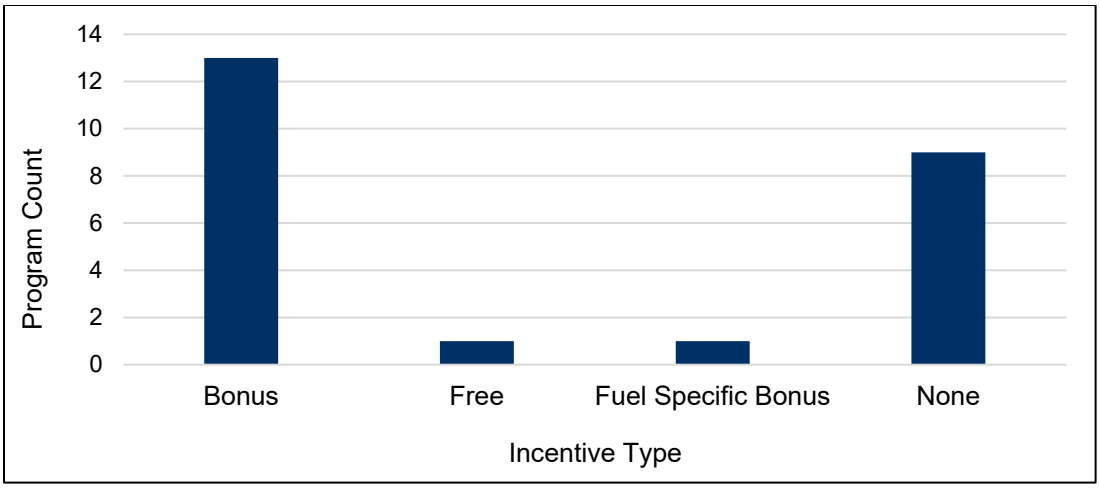

Figure 14: Income Eligible ASHP Programs in the Northeast

5.4.3 Northeast Strategies for Stakeholder Engagement

5.4.3.1 Contractor Engagement

There are sixteen Northeast regional programs that offer contractor or contractor and distributor networks (Figure 15). Network participants are required to provide proof of legal business and license verification, participate in training, and meet education requirements. The size of contractor networks varies dramatically across different programs (ranging from six contractors to more than 2,000 contractors per network), due to a mix of active and inactive network participants and a lack of distinction between general HVAC and heat pump-specific contractors. Increased contractor awareness is a key factor in the regional growth in heat pump sales of the Northeast.[25] Programs can work with contractors to ensure properly sized equipment through quality assurance, training for contractors, and clarification of rebate units of measure. Contractor networks support quality installations and create a structure where contractors who do not meet performance requirements can be removed.

[25] Northeast Energy Efficiency Partnerships (NEEP) plans to publish additional analysis specific to the Northeast in the near future and will be accessible via the following link: https://neep.org/resources

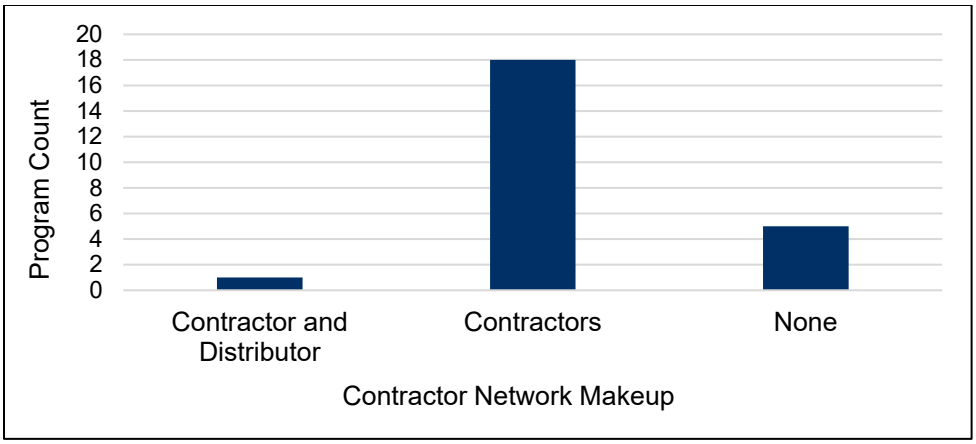

Figure 15: Programs with contractor and/or distributor networks

5.4.3.2 Manufacturer and Distributor Engagement

Midstream HVAC programs in the Northeast implement the following key strategies to engage distributors:

Limited data collection: Collect only essential data to reduce administrative burden for distributors, who are not prepared to collect extensive data from customers. In many programs, distributors must collect and submit customer data from the contractor, equipment cost, and installation contractor information to verify the ASHP installation took place.

Timely rebate payments: Timely incentive payments are critical to building trust with distributors and reducing non-payment or payment delay concerns. Program administrators can implement point-of-sale discounts through cooperative agreements with distributors to ensure high-efficiency HVAC options are readily available and promoted. Programs can also implement incentive pass-through techniques, where they require incentives to be paid to contractors through the distributors.

Reduce supply chain risks: Engaging manufacturers is important to reduce risks for supply chain partners. Additionally, engaging manufacturers encourages distributors to increase the availability of energy efficiency products for the broader contractor network by ensuring product availability, providing education, aligning on messaging, and supporting marketing.

Program consistency: Ensuring consistency of program requirements, incentives, and providing sufficient timing for changes to occur allows distributors to become comfortable with program offerings and builds trust when changes take place.

Communication: Regular communication is critical to building long-term relationships between utilities, program administrators, and distributors. Programs can manage distributor expectations for rebate payments by providing clear guidelines and timelines

for the verification process.[26] Providing distributors with status updates on rebate applications and payments is a strategy to streamline communication between utilities and distributors. Regular check-ins with manufacturers and distributors maintain open dialogue, which is necessary to share emerging opportunities and address technical challenges.

5.4.3.3 Strategies for Customer Engagement

Maintaining transparency throughout the rebate payment process and providing clear guidelines and timelines for incentive payments builds trust and improves customer engagement in programs in the Northeast.

6 Heat Pump Water Heater Program Findings

Residential heat pump water heater (HPWH) programs offered by utilities in the Midwest and Southeast were interviewed to identify market trends. No data on HPWH programs was collected in the Northeast for this report.

6.1 National Context for Heat Pump Water Heaters

HPWH sales more than tripled in the last decade, with 190,000 units ordered in the United States in 2023 compared to 43,000 units in 2013. Comparatively, 4.9 million electric water heaters were ordered in 2023 and 4.3 million gas water heaters shipped in 2023 (Rocky Mountain Institute 2025). Despite the large growth in HPWH sales, HPWHs made up only 2% of total U.S. water heater sales in 2023, compared to approximately 53% of water heater sales as electric water heaters and approximately 45% as gas water heaters (Wachunas 2024). In the Northwest, HPWH market share was estimated to be as high as 9% in 2019 (Reynolds, 2019). In 2024, HPWH equipment and installations cost an estimated $1,500 to $3,000 (Jutras 2024). Electric tank costs ranged between $450 to $1,200, tank water heaters fueled by gas cost $500 to $1,500, and tankless gas cost $800 to $2,000.

6.2 Summary of Midwest Program Approaches

Of the 31 midwestern utility program administrators interviewed, 26 program administrators offer HPWH programs. These programs are offered by investor-owned, municipal, state-owned, and cooperative utilities. The average rebates offered by midwestern utilities ranges from $460 to $584, with utilities in Indiana offering the highest average maximum rebate of $900, as shown in Table 8. Meanwhile, utilities in Iowa offer the lowest average minimum rebate. The age of utility HPWH programs varies, with some launching in 2016 and most programs starting more recently. Almost all programs experience low installations and customer participation. Technology-friendly customers tend to be early adopters of HPWHs.

[26] Northeast Energy Efficiency Partnerships (NEEP) is expected to publish additional analysis specific to the Northeast in the near future and will be accessible via the following link: https://neep.org/resources.

Table 8: HPWH Programs and Average Rebates Offered in Midwest by Utilities

State	Count of Analyzed HPWH programs	Total Utility Programs Reviewed in Data	Average Minimum Rebate	Average Maximum Rebate
IA	2	4	$225	$313
IL	2	4	$513	$688
IN	4	4	$633	$900
KS	0	1	-	-
KY	1	3	$350	$350
MI	5	7	$800	$833
MN	2	4	$300	$350
MO	3	4	$525	$517
ND	1	2	$100	$400
NE	2	4	$450	$575
OH	1	4	$400	$800
SD	2	2	$200	$350
WI	1	2	$300	-
Total	26	45	$460	$584

6.2.1 Midwest Program Analysis

Across the 26 utility HPWH programs, 21 programs follow downstream approaches, four follow midstream approaches, and one follows an upstream and midstream approach. Downstream programs most frequently offer minimum rebate amounts of $400 and $500, and the most frequently offered maximum rebate was $500 (Figure 16, Figure 17). The data did not reveal significant differences in the frequency of rebate minimum and maximum offerings across downstream and midstream approaches. Midstream and upstream program approaches and utility rebate amounts offered do not follow a trend, likely due to a lack of sufficient data, with only four midstream programs and one upstream/midstream program observed in the data.

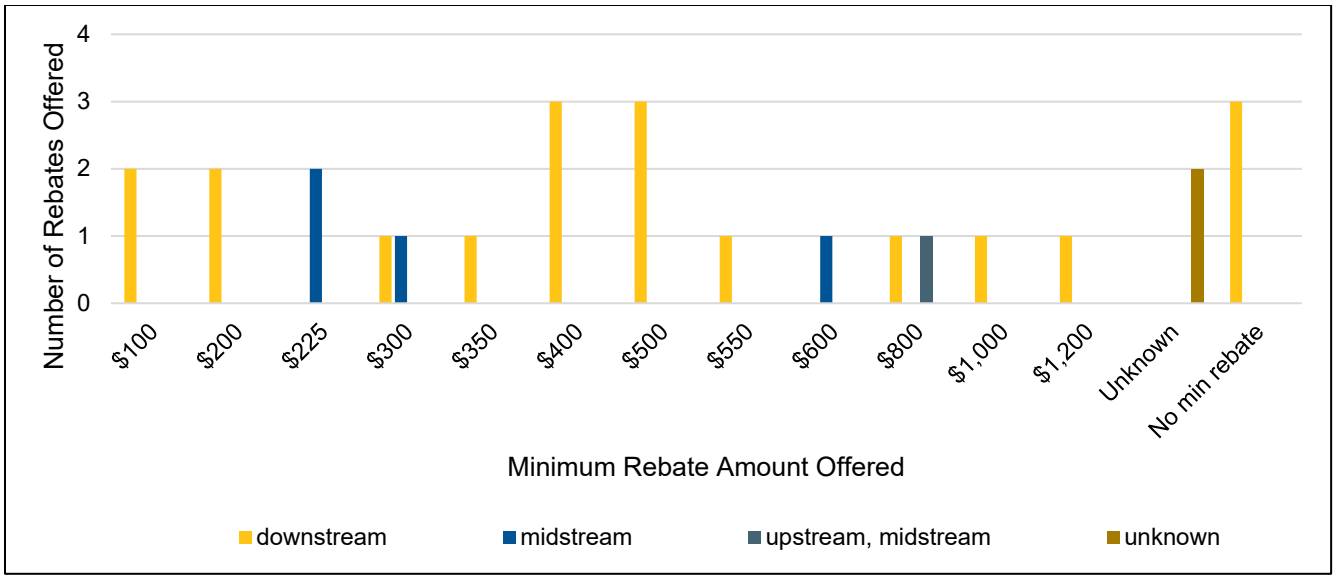

Figure 16: Frequency of Minimum Rebate Amounts Offered by Midwest Utilities by Approach

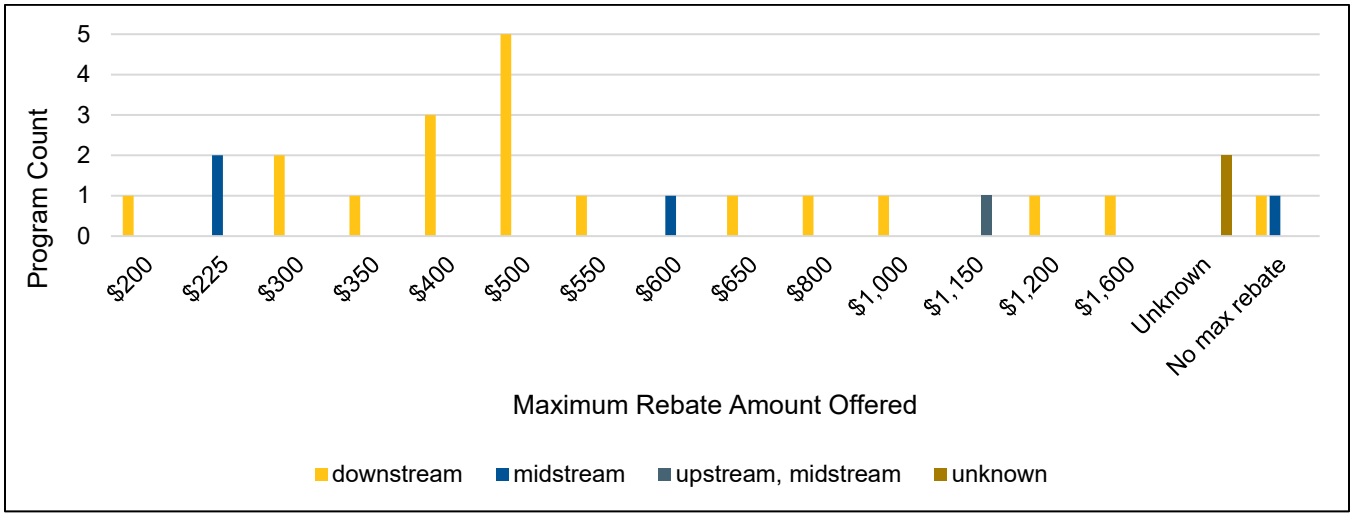

Figure 17: Frequency of Maximum Rebate Amounts Offered by Midwest Utilities by Approach

Midstream approaches that educate contractors, builders, and distributors on utility program offerings lead to greater promotion and advocacy for heat pump and HPWH technologies. The majority of midwestern utility HPWH programs offer per project or per residence rebates. Instant discount programs through distributors incentivize large retailers to stock HPWHs, addressing low or no supply issues in certain service territories.

Contractors and customers are hesitant to adopt HPWHs as they are unfamiliar with the technology and its performance in colder climates. HPWHs are perceived to have maintenance complexities due to newer technology systems. Contractors also express concerns about the logistical considerations needed for installation, such as keeping the unit upright for two hours and fitting units into standard trucks. To combat these challenges, utilities can focus on efforts to build contractor confidence with HPWHs by

providing information on technological performance and training on installation and maintenance.

HPWH cost remains a challenge for customers facing higher upfront costs compared to traditional systems. One utility was able to supply HPWHs at no cost to customers whose water heaters broke by using health and safety funds to fund the replacement. Other utilities explored emergency replacement scenarios to reduce unit costs by bulk purchasing HPWH options to have on supply, should a customer need to replace their system. This strategy was expected to enhance affordability for customers and ensure contractors knew a supply of HPWHs was available. While these strategies may help address affordability at the unit cost level, there is still opportunity for improvement in addressing the cost of installation, which can be higher for HPWHs due to installers lacking experience with the equipment.

Other utilities face slow engagement from customers in their HPWH programs because incorrect installation does not leave enough airflow for the units. In one utility's service territory, a post-installation study of HPWHs revealed that 70% of the units installed failed within the first six months due to compressor issues and poor ventilation from improper installation. Training contractors to follow manufacturer specifications, identify properly sized HPWH technology, and practice proper installation techniques can reduce or eliminate equipment failure.[27] Smaller training engagements that align with contractor schedules or local industry events may be more accessible to contractors.

6.3 Summary of Southeast Program Approaches

Southeastern utilities offer HPWH rebates on a per project or per residence basis and occasionally offer contractor bonuses. The per project or per residence rebate is typically provided to homeowners, while contractor bonuses are paid directly to the contractor. Some utilities increased their rebate offerings and experienced greater engagement from customers for HPWHs. Average rebates in the Southeast range from $250 to $1,150 (Table 9).

Table 9: HPWH Programs and Average Rebates Offered in Southeast by Utilities

Region	Minimum Rebate*	Maximum Rebate*
Southeast	$250	$1,150

*Detailed state level data not available to calculate average rebates as done for midwestern utilities.

6.3.1 Southeast Program Analysis

Utilities in the Southeast employed several different strategies to increase awareness and engagement with HPWH programs. Some Southeastern utilities designed HPWH

[27] The Advanced Water Heating Initiative published a technical guide that highlights features, benefits, installer considerations and best practices, and design considerations to support HPWH adoption.

programs with qualified contractor networks. Utilities with qualified contractor networks paid for contractors to obtain BPI certifications and regularly trained contractors on program offerings and standards. This model provided the utility with a trained group of contractors who could provide recommendations and upgrades to customers related to the utility's program offerings. Providing training to distributors expands awareness of utility HPWH programs and incentives. Community events with information booths are also a strategy implemented to increase customer engagement. One program administrator trained sales associates at major retailers and provided signage and materials to market the programs. Another utility partnered with distributors to offer HPWH installation and sales training to contractors and saw an increase in HPWH program participation following the training.

Contractor engagement and training benefits contractor businesses and leads to more robust private sector offerings for customers, increasing the number of qualified contractors and customer choice. One contractor expanded their services from HVAC to include plumbing after becoming comfortable selling water heaters and learning when HPWHs best fit customers' needs.

Southeastern HPWH programs faced similar challenges to Midwestern utilities, including an aging contractor workforce wary of new technologies, unfamiliarity with HPWH technology, and confusion over whether plumbers or HVAC technicians should install HPWHs. Contractors also found rebate paperwork burdensome, a concern expressed throughout rebate programs regardless of technology. Some utilities noted gaps in access to data or limited staff availability to collect data to verify HPWH installations. Smaller rebate incentives, $350 to $400, were too low compared to installation costs, $1,200 to $6,000, to drive changes in customer participation. Customer awareness of HPWHs and lack of familiarity with the technology remains a challenge for participation in utility HPWH program.

7 Building Envelope Program Findings

Envelope programs include insulation, air and duct sealing, and window replacement programs and vary by region. In the Midwest, utilities focus on attic, roof, duct, and wall insulation, air sealing, and window replacement. In the Southeast, the focus is on general weatherization and whole home retrofit programs, which include lighting, smart thermostat, attic and duct insulation, and air sealing with potential HVAC upgrades or replacements. In the Northeast, programs focus on air sealing and insulation as well as window replacement, duct, and whole home weatherization programs. Utilities experience similar challenges across envelope measure programs despite differing focuses.

Midwestern utilities offering envelope measure upgrades identified three specific objectives for their programs:

- Understand the benefits of incremental envelope upgrades compared to comprehensive, or whole home, approaches.

- Provide envelope upgrade programs for income-qualified customers. Across 31 Midwestern utility program administrators, 22 programs are offered to low-income customers, of which 20 offer envelope programs.

- Understand program envelope designs that can be tailored to achieve cost-effective energy savings in new building construction.

Northeastern envelope measure program administrators identified the following objectives for their programs:

- Continue to offer cost-effective programs to market rate customers.

- Lower utility bills for low-to-moderate income households. Many state-led programs provide low-to-no cost funding for envelope upgrades for income qualified customers.

- Improve home comfort, health, and safety for customers.

Southeastern envelope program administrators identified the following objectives for their programs:

- Continue to offer weatherization and whole home retrofit programs.

- Engage income-qualifying customers to provide whole home retrofits.

- Continue to offer cost-effective programs for market rate customers.

7.1 National Context for Building Envelopes

The median spend for U.S. households on home renovations in 2020 was $1,500, with roofing, windows, and doors comprising 20% to 30% of all home renovation projects, and insulation comprising 6% to 14% of projects (Cort et all 2022). Home renovation costs tend to correlate with home values across the United States and are driven by factors such as availability of labor, building supply constraints, and population growth. The highest average spending on insulation projects is in the Northeast and Midwest.

The energy savings-to-investment ratios (SIR) for different envelope measures vary for single-family homes based on housing stock characteristics, resident behavior, and local climate zone (Present 2024).[28] However, data indicates that a significant portion of existing homes could benefit from envelope improvements and the resultant energy savings. Specifically:

[28] The study used ResStock data, a U.S. Department of Energy model of the residential building stock, developed and maintained by NREL. The data was for single-family homes on the cost-effectiveness of adding exterior insulation, window attachments such as storm windows or solar screens, and/or replacing windows with high-r triple-pane windows.

- Adding one-inch of rigid exterior insulation (with air sealing house wrap) when replacing a home's siding results in the highest SIR compared to other envelope upgrades; however, this is dependent on adding the insulation to an already-in-process siding replacement project where only the incremental cost of adding insulation is considered.

- For homes built before 1970 in cold and mixed-humid climates, adding insulation during re-siding is cost-effective for 85% of eligible homes.

- For homes built before 1970 in warm climates, adding insulation during re-siding is cost-effective for 55% of eligible homes.

- When homes have single- or double-pane clear glass windows, the SIR is positive in cold climate zones for both window replacement (with triple panes) or for the addition of a low-emissivity storm window.

- The combination of insulation, re-siding, and low-emissivity storm window upgrades are cost-effective for 85% of eligible homes built before 1970 in cold and mixed-humid climates.

7.2 Summary of Midwest Program Approaches

The 31 utility program administrator interviews revealed that utilities in 11 Midwestern states offered an envelope program to customers in their service territories; only North Dakota and South Dakota did not offer envelope programs. The most popular and basic envelope measures are attic insulation and air sealing, with 25 attic insulation and 23 air sealing programs. Duct sealing and insulation programs focus on sealing and/or insulation. There are 15 utility duct insulation/sealing and 15 wall insulation programs in the Midwest. Very few utilities/administrators offer whole home envelope programs (six programs offered), energy efficient windows or window attachments such as low-emissivity storm windows (five programs offered), or roof insulation (four programs offered) (Table 10).

In addition to more common "per project" rebates for envelope programs, utilities also offer creatively priced rebates for envelope programs, such as rebates based on percent of project cost, material cost, or square footage of insulation for duct, attic, roof, and wall insulation projects. For air sealing, a few programs offer benefits calculated based on reduced air leakage measured in dollars per cubic feet per minute. Many utilities co-promote attic insulation and air sealing work, even mandating these upgrades to be completed together to qualify for the rebate.

Utilities offering envelope programs in every state set maximum rebate amounts ranging from $240 for duct insulation/sealing to $600 for roof insulation. Whole home programs offered an average maximum rebate of $1,667. Few utilities set minimum rebates for their envelope programs (Table 11 and Table 12).

7.2.1 Midwest Market Rate Program Analysis

Midwestern utility programs typically employed downstream approaches, regardless of the type of envelope measure, with four whole home programs, 12 duct insulation/sealing, 19 attic insulation, three roof insulation, 17 air sealing, 12 wall insulation, and three energy efficient windows programs. Midstream approaches, or a combination of midstream and downstream, are rarely offered by utilities for envelope measure programs as shown in Figure 18. Among midstream approaches for utility envelope programs, there are two duct insulation/sealing, three attic insulation, and three air sealing programs. One utility envelope program offers both midstream and downstream approaches to rebates for duct, attic, roof, and wall insulation.[29]

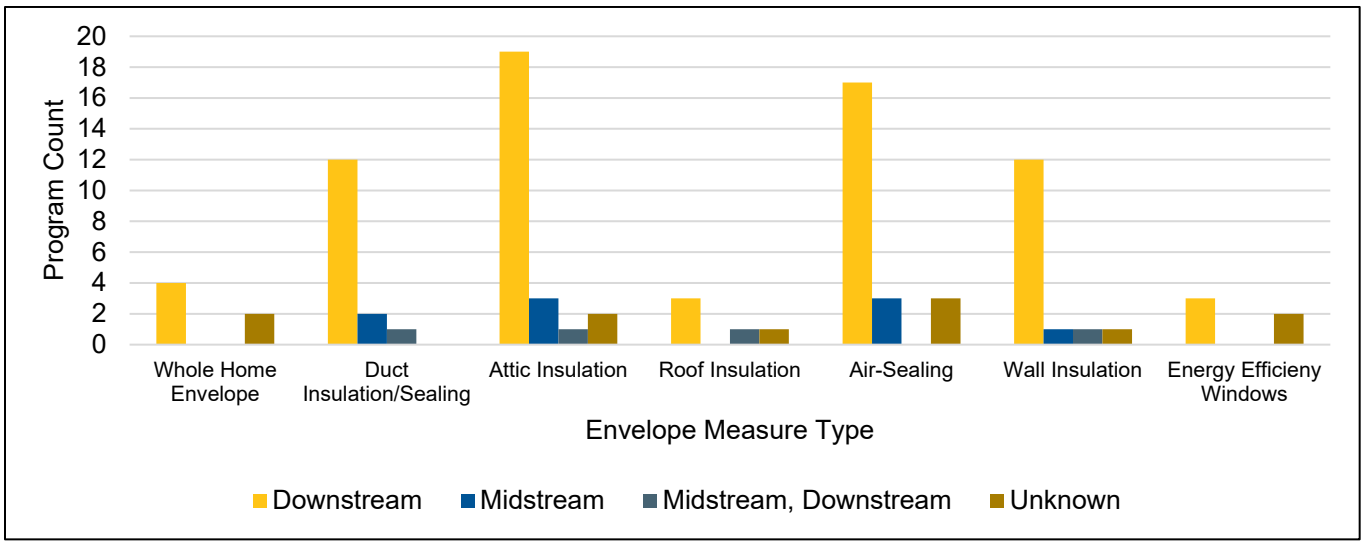

Figure 18: Program Approaches of Envelope Programs Offered by Midwest Utilities by Measure Type

Envelope upgrade data was incomplete across different measures for the utilities included in this report. Envelope upgrade data was only available for whole home, duct insulation/sealing, attic insulation, air sealing, and wall insulation programs. Twelve of the 31 midwestern utility program administrators interviewed had available data. To analyze envelope measure upgrade trends the following assumptions were made:

- The data captures a fraction of the envelope program installations by household and detailed conclusions about program participation and regional customer interest in envelope programs cannot be made from the data at this time.
- No data from 2024 is included because the data collection was ongoing.

[29] There was not enough data to compare average rebate amounts offered by utilities between midstream and downstream approaches to understand whether rebate amounts correlated with the approach.

- While envelope measure rebates are offered as per household, per project, and total area covered, the data is based on per household upgrades.
- Attic insulation and air sealing upgrades are presumed to have been completed concurrently since data collection methods did not differentiate between times when one or both upgrades were made.

The data depicts a steady rise of envelope upgrades through utility envelope programs. Figure 19 shows a greater number of installations for attic insulation and air sealing. However, this trend was not attributed to a greater interest in these measures, but rather the fact that more utilities reviewed for this report offered attic insulation and air sealing rebates compared to the other envelope measures.

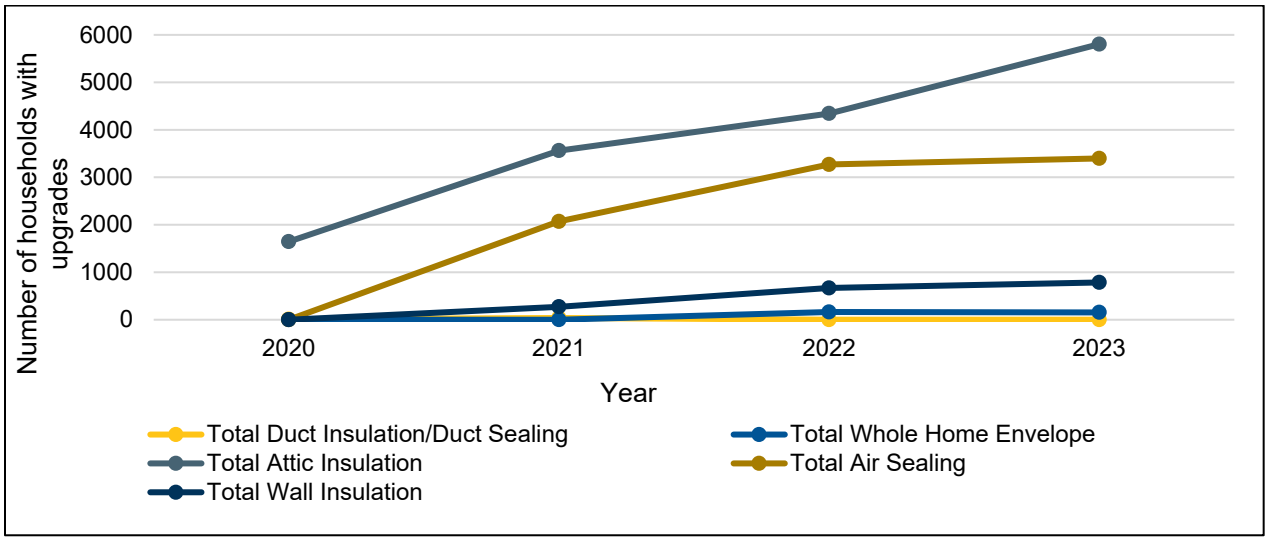

Figure 19: Number of Household Installations by Envelope Measure Type for Midwest Utility Programs[30]

All utility types offer various envelope measure offerings (Figure 20), apart from whole home programs, which are only offered by investor-owned and municipal utilities among the 31 Midwestern utility program administrators interviewed. Of the Midwestern utilities reviewed for the report, whole-home envelope programs are largely not offered or lack comprehensive measures such as windows and doors.

[30] Note that the graph is based on incomplete data on envelope installations by household from 12 utilities across 11 states.

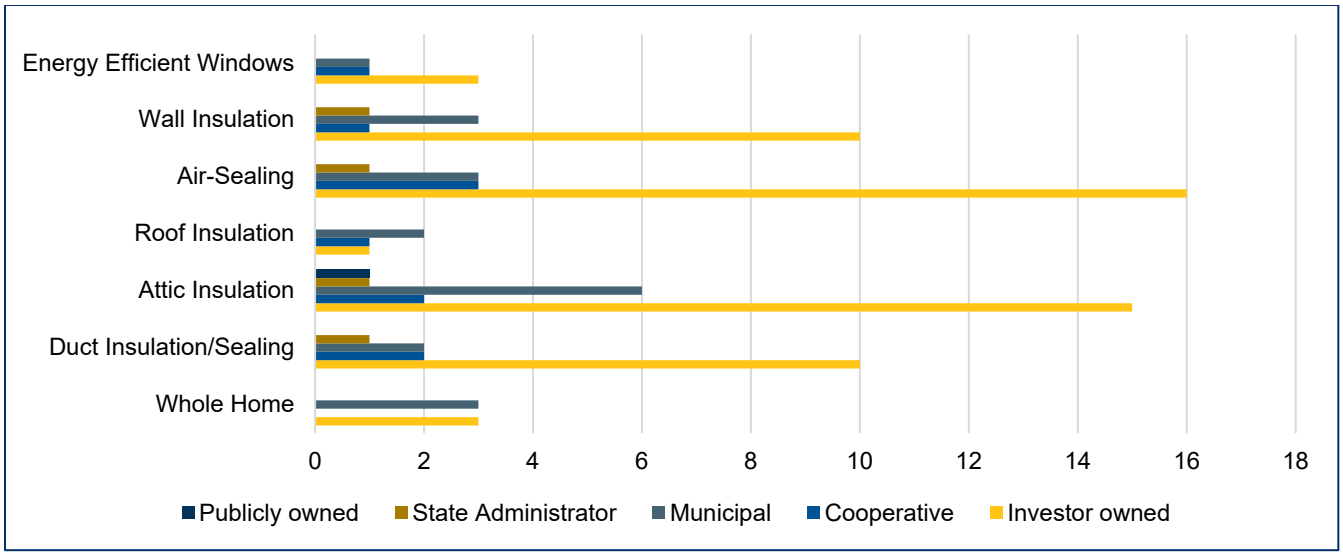

Figure 20: Number of Utility Envelope Programs by Utility Type in the Midwest

7.2.1.1 Challenges and Opportunities with Building Envelope Programs

Multiple Midwestern utilities face challenges with envelope programs failing to meet cost-effectiveness tests and having to be discontinued. Discontinued programs include window and whole home envelope upgrade programs. Programs are designed around either cost-effectiveness tests (i.e., total resource cost or societal cost) or derived target savings in dollars per MMBTU, which may be based on specifications in the state TRM.

Explaining envelope upgrades to customers and convincing them to undertake the upgrades is another challenge utilities face due to the unique nature of each home and maintaining envelope upgrades to internal cost-effectiveness tests. High upfront cost and longer payback periods deter customers and programs, despite measures being cost-effective over time. Some manufacturers offer tools to contractors to provide detailed savings projections, but the expected savings cannot be guaranteed. Window program incentives struggled for several reasons, including customers submitting applications for windows that did not qualify. However, one manufacturer revealed that there was a shortage of energy efficient windows that complied with ENERGY STAR Version 7 guidelines.

7.2.2 Midwest Income Qualified Program Analysis

Midwestern utilities emphasized envelope upgrades for income-qualified customers, with 20 of the 22 programs offering low-income customers with envelope upgrades. Proactive customer targeting was a priority for many utilities offering income-qualified programs. Twelve programs offered only envelope upgrades, while eight programs offered both heat pumps and envelope upgrades to low-income customers. Most of these offerings prioritized envelope improvement needs before heat pump or HPWHs were considered. As a result, one utility noted that contractors working with low-income customers possess stronger expertise about the utility bill impacts a customer may face since they must address weatherization before addressing heat pump and HPWH needs.

A few utilities provided information on the maximum costs covered by a program for envelope upgrades, which were between $2,000 and $2,400 per household and covered insulation and air sealing. Common program designs for income-qualified envelope programs involve a home energy audit to identify the type of upgrade where the most energy savings can be achieved and involve using a qualified contractor to complete the upgrade.

7.2.3 Midwest Multifamily Program Analysis

Eighteen multifamily programs were offered across ten states among the 31 utility program administrators reviewed in the data. Of the 18 multifamily programs, six offered envelope upgrades and nine offered envelope and heat pump upgrades. In market rate multifamily programs, building owners typically cover the portion of upgrade costs that the rebate did not cover. However, for income-qualified programs offered by some electric utilities for multifamily buildings, the total cost of weatherization is covered as part of a collaboration with gas utilities and community organizations. Midwestern utilities had varying definitions of “income-qualified,” such as 50% of tenants being within income-qualified guidelines based on area median income or federal poverty levels.

Multifamily envelope program offerings ranged widely, including attic, wall, basement, rim joist, floor, and crawl space insulation, broken windows, and air and duct sealing. Some utilities opted to focus on upgrades that showed immediate, tangible, and cost-effective benefits, such as weather stripping and caulking around windows and doors. Some utilities expressed concern that efficient window and secondary glazing incentive rebates would have low interest due to cost issues.

7.3 Summary of Northeast Program Approaches

NEEP conducted research on 23 utility and state-administered envelope programs in 12 states and the District of Columbia. Air sealing and insulation rebates were offered the most, while windows and duct sealing rebates were only mentioned in four of the 23 programs. Nine programs offered whole home or weatherization assistance for income qualified customers. Two jurisdictions had standalone windows programs, focusing on EnergyStar and triple pane windows. The range of envelope measure offerings included:

- Air sealing for walls, windows, and ducts
- Insulation (including wall, attic, and duct)
- Windows, ENERGY STAR, and triple pane
- Whole home programs
- Wall insulation

Air sealing costs were estimated to range from $600 to $6,000 for a single-family home. Projects requiring the addition of controlled ventilation fans added increased cost ranging from $150 to $800. Radon removal was also found to add several hundred to several thousand dollars to project cost in some cases. In the limited data available, NEEP found that, for one state, less than one quarter of customers who responded to the survey had taken some action to assess air leaks, indicating a lack of public awareness.

Envelope measure rebates offered in the Northeast varied, ranging from several hundred dollars for a specific envelope measure to $2,000 to $5,000 for standard market rate insulation and air sealing upgrades, covering 17% to 40% of the costs for insulation and air sealing. Almost all programs with rebates offered low-interest loans to residents through the program or a partner lender. The financing tended to be flexible, allowing customers to spend on envelope, HVAC upgrades, and sometimes minor pre-weatherization costs. NEEP estimated that more than 150,000 homes in the Northeast participated in envelope upgrade programs per year.

Programs in all states except Maine and West Virginia required a home assessment, offered at no or low cost and sometimes done virtually. Utilities provided energy coaches to help residents through the steps for the process for different upgrades.

Many insulation rebate programs did not allow spray foam due to health and safety concerns for installers and occupants. This technology requires evacuation of the home, specialized equipment, and labor for the contractors. Careful moisture management is needed as well. However, spray foam was seen as an opportunity to increase efficiency and cost-effectiveness of utility envelope programs for select applications such as appropriate attic duct sealing, attic air sealing, and attic encapsulating measures.

7.3.1 Northeast Market Rate Program Analysis

According to NEEP, “no reliable national or northeastern regional collection of program data was found for the number of houses that have received general envelope upgrades or specific envelope measures.”[31] The research showed that the costs varied for similar envelope improvements depending on a house’s age, structure, and building materials. However, certain jurisdictions had undertaken baseline studies to better characterize the regional opportunities for envelope programs.

Data from some northeastern states indicated that the share of homes with additional wall or foundation insulation was three-to-four times higher in the region than the Midwest, with coldness extremes likely being a primary factor. Some jurisdiction had insulation increasing from R-12 to R-15.6. Regional contractors estimated 10% to 30% reduced energy use from adding insulation where none had existed before. Programs modeled insulation to determine cost-effectiveness of retrofit upgrades. Blow cellulose and fiberglass insulation were the most common. Robust weatherization programs in

[31] NEEP Envelope Market Assessment Report

some jurisdictions were seen to drive more interest in insulation upgrades when offered. More customers undertook attic insulation retrofits than other types of insulation retrofit, yet many homes still had R-values lower than the most recent code specifics, based on limited data from specific jurisdictions.

Insulation and air sealing present an opportunity to increase savings and reduce costs by optimizing materials, access, and labor. Programs were found to rely on skilled envelope improvement contractors to identify these opportunities as a part of an initial assessment.

Although customers asked about window replacement rebates, stakeholders interviewed by NEEP noted that programs typically did not meet cost-effectiveness criteria unless they were single-pane windows. Some programs, such as in Massachusetts, require that weatherization be completed before receiving heat pump rebates.

Northeastern program administrators mentioned needing to increase funding to improve program participation but did not have consensus on where or how to use it. Consistent funding and guidelines are a key piece to building customer trust for envelope programs, prevent disruptions to programs, and avoid confusion with changes in regulations, funding, or program inconsistencies.

7.3.1.1 Challenges and Opportunities with Utility Envelope Programs

Northeastern utilities identified the following categories of challenges and opportunities:

- **Cost-effectiveness requirements:** Similar to other regions, state and utility envelope measure programs sometimes face challenges with meeting cost-effectiveness program requirements.

- **Pre-weatherization stage:** The pre-weatherization stage was highlighted by several program administrators as a part of the weatherization process where participation stalled in envelope programs. Landlords and tenants are wary of having their homes examined to analyze the type of weatherization that could be conducted because the work interferes with living situations. Additional questions on who pays, rent increases, and other costs make low and middle-income residents less likely to be interested in pursuing weatherization past the initial assessment phase.

- **Tax credits:** Program administrators noted the importance of federal tax credits, such as the 25C tax credit, because customers may seek to participate in envelope upgrades after learning about the potential tax credit benefits.[32]

[32] The 25C tax credit was also known as the Energy Efficiency Home Improvement Credit designed to encourage homeowners to undertake energy efficiency upgrades.

- **Support contractor development:** Supporting existing contractors in improving their knowledge, business models, capacities, and new business development is important for program success. Expanding the envelope contractor workforce is important to maintain a supply of trained workers.

- **Drive consumer education and awareness:** Landlords, homeowners, renters, and other customers lack understanding on envelope upgrades, and education and awareness would support better customer decision-making.

- **Program enhancement opportunities:** This set of opportunities involved program-specific insights on program design, quality assurance elements, envelope improvement knowledge, and coordination with heat pump projects.

7.3.2 Northeast Income Qualified Program Analysis

Northeastern income qualified programs for envelope upgrades covered all or most costs, sometimes exceeding $10,000 per home. In one program, staff focused on water issues and foundation cracks for low-to-moderate income customers to address problems before conducting weatherization upgrades.

The programs measured savings-to-investment ratios across expected lifetime savings. Several programs in the region relied on additional organizations to fund income qualified programs, with some states dedicating portions of their funding for communities through green banks or low-to-no interest loans. Programs with limited funding used flawed metrics such as lowering the average cost per house as a measure of program efficiency, which led to haphazard envelope improvements and delayed opportunities to fully weatherize homes. These stakeholders felt deep, comprehensive retrofits could improve the quality of installations and reduce customer energy costs.

7.4 Summary of Southeast Program Approaches

SEEA conducted research through the review of available program information and interviews with major utilities identified across eight states, covering IOUs, municipal, cooperative, and public utilities. Southeastern envelope upgrade programs primarily support four types of envelope upgrades:

- Air sealing services

- Duct repair and sealing

- Ceiling insulation

- Attic insulation

Some envelope upgrade programs also include other types of upgrades, such as HVACs and water heaters. Utility program administrators use downstream approaches to engage customers, through methods such as storefront partnerships, online marketplaces, and contractor engagement. In some cases, the contractor offers a

discount to the customer and receives the incentive. SEEA identified three major pathways for envelope upgrades:

- Rebate programs
- Weatherization and whole home retrofit programs
- A neighborhood style program in which the utility engages in particular areas to educate customers and encourage them to upgrade

Southeastern utility envelope upgrade programs tend to offer rebates per project for whole home programs or per square feet. Similar to the Northeast, a southeastern utility offers market rate customers on-bill repayments with rebates applied to the total cost of upgrades, and one program offers $25,000 loans with 60-to-84-month terms and 9% to 19% interest rates for a combination of HVAC, water heating, and weatherization upgrades.

7.4.1 Southeast Market Rate Program Analysis

All southeastern states had utilities with programs offering rebates for a range of envelope upgrades. Envelope upgrade offerings in the Southeast consist of window replacements, attic insulation, air sealing, duct insulation, and duct sealing. The customer qualifications, rebate amount, and delivery of the rebate vary significantly by state and utility.

Among the program administrators interviewed by SEEA, eight states have utilities with programs that feature either weatherization or whole home retrofits. These programs require the customer to express their interest in initiating an approval process where, if approved, the utility provides an energy audit and recommends upgrades intended to lower energy use and energy costs. A qualified contractor completes the upgrades. In one program, the utility covers the full upgrade cost. This program often includes HVAC technology, along with efficient envelope improvements.

Neighborhood programs in the Southeast target a select portion of a utility's customer base based on household income, using metrics associated with federal poverty level or area median income. Households that meet this target are eligible, and the utility contacts customers directly to educate and enroll them. The program then resembles the whole home retrofit programs described above.

Program administrators in the Southeast described envelope upgrade programs as undersubscribed due to several factors:

- Envelope insulation upgrades are not tangible or interactive so are often overlooked.
- Envelope upgrades involve an invasive process, particularly in the case of wall insulation.

- The rebates offered are just a small percentage of the overall cost, which results in out-of-pocket costs that exceed the amount customers are willing to pay.

- Customers are often unaware of any offered program due to a lack of robust utility marketing.

Additionally, existing envelope upgrade programs in the Southeast struggled with program performance due to:

- Limited contractor networks, especially in rural and underserved regions.

- Deferral of weatherization upgrades due to health and safety concerns when upgrading older homes.

- A lack of sufficient return on investment for utilities or contractors.

Window replacement rebates are challenging to maintain in the Southeast as they fail to meet cost-effectiveness criteria, which is the primary factor for utilities to consider an envelope program a success. The monetary cost of the program, relative to its benefits as defined by the program administrator, determines if the utility continues to offer it. For example, while the energy loss from older windows can have limited benefits relative to replacement costs, when a window is a source of major energy waste, such as if the glass is broken, then the benefits outweigh the costs. Customers in the Southeast often prioritize windows for comfort, whereas utilities prioritize other weatherization measures that have a shorter payback period.

7.4.1.1 Challenges and Opportunities with Utility Envelope Programs

SEEA's research identified four opportunities to improve participation in southeastern envelope upgrade programs:

- **Marketing Strategies:** Pursuing more targeted marketing strategies to engage the customer base improves envelope measure programs. Low-to-middle-income households take advantage of rebates and utility programs at a lower rate than middle-to-high-income households. Rather than target customers based on income criteria, which may stigmatize customers, utilities could market potential energy savings to customers and garner customer interest through cost benefits.

- **Educational Materials:** Programs have been in place for decades, offering customers opportunities to reduce their energy consumption and energy bills. However, participation continues to lag. Utilities seek support in educating customers on the technology and products that are best suited to their homes, financial situation, and energy savings needs.

- **Incentivize Trade Allies:** Investing in contractor training or monetary incentives is critical to equipping the contractor with the information necessary to discuss energy and cost-saving options with customers and the skills to install products and technologies effectively.

- **Increase Partnerships:** Encouraging partnerships with local organizations to overcome the barriers to weatherization and energy efficiency upgrades helps some utilities increase engagement in their programs.

7.4.2 Southeast Income Qualified Program Analysis

Of the eight states SEEA interviewed, at least one program offers no-cost envelope upgrades for low-income customers. The upgrades are conducted by qualified contractors and financed through partnerships between state-administered programs and local non-profits. Utilities target customers using publicly available data on neighborhood income levels to identify households within the federal poverty guidelines set for the programs.

For many southeastern utilities, income qualified programs need to meet certain savings thresholds relative to the cost of the program to ensure stakeholders receive a return on their investment. However, some utilities support an income-qualified program that does not need to meet a savings threshold: a small IOU reaching 1,500-2,000 customers annually and another with a. program that serves 100 households annually for attic insulation, covering costs for customers with significant need, defined as 50% of the neighborhood living at or below 150% of Federal Poverty Guidelines.

7.5 Summary of Utility Strategies for Contractor Engagement and Training

7.5.1 Midwest

Contractor Pipeline: Utilities with envelope measure rebate programs did not highlight specific aspects about the envelope contractor pipeline.

Contractor Engagement: Midwestern utilities mentioned similar strategies for engaging contractors, including favoring direct relationships to facilitate collaboration to improve program designs. Some midwestern utility programs also mentioned providing training and quality assurance checks for envelope improvements, such as general training for low-emissivity storm windows.

7.5.2 Northeast

Contractor Pipeline: Northeastern utility envelope rebate programs tend not to have contractor networks for home energy assessors and weatherization. NEEP's research found that there were about 18 times as many HVAC installers in northeastern programs' contractor networks than home energy assessors and envelope contractors.

Contractor Engagement: Although not all programs have a contractor network, all programs agree on the need to maintain strong contractor relationships. Several state energy efficiency programs cultivate relationships with contractor groups to enable feedback, disseminate program information, and inform contractors of program changes or contractor requirements. For example, Massachusetts holds monthly best-practice working groups, which several interviewees mentioned was an important way to receive consistent and transparent feedback from contractors. Programs in New York also conduct regular open meetings with contractors.

Northeastern envelope programs with higher rebates tend to have more contractor requirements. Programs expressed strong favorability for BPI certifications, with some noting that it provides a good benchmark for programs. Other requirements include background checks, licenses, combustion safety certification, review of past performance in weatherization programs, window training, program-specific training, and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), ICP, or LEED certifications.

Some northeastern program administrators remarked that multiple organizations and individual manufacturers set standards for envelope upgrades, but that contractors would benefit from streamlined product and install standards, certifications, and program rules. Since envelope technologies for market rate customers tend to change rapidly with technological improvements, such as spray foam and digital tools for home assessments, administrators felt simplifying programs would help contractors adapt to changes in innovation.

Contractor training needs to be an ongoing and essential part of programs due to high turnover rates in the industry. Potential methods involve short, basic, or informal trainings to raise standards for installers. Early outreach via internships and other workforce attraction programs could train new contractors in standardized envelope installation methods to help increase the envelope contractor pipeline.

7.5.3 Southeast

Contractor Pipeline: Some southeastern IOUs use contractor networks consisting of two to 1,200 contractors to strengthen their program reach, improve contractor skills, and provide quality checks. The program with an extensive network of 1,200 contractors was developed with the utility's HVAC training center, which has been in operation for nearly forty years and trained over 38,000 contractors across the United States. In 2017, the utility partnered with a community college to expand the facility and invest in technology labs, expert trainers, and simulators.

Contractor Engagement: The programs set varying requirements, including training through a well-established training center program, continuing education, licenses, and insurance. Strong contractor networks typically receive technical training to learn about technologies, sales and marketing training, and information on program rebates and rules. Popular training methods include in-person seminars and virtual meetings. One utility also audits the first few upgrades installed by contractors in the network.

One southeastern utility maintains a high standard for the contractors it employs to carry out programs and interact with customers. Once an interested contractor has been vetted, the utility pays for the contractor's BPI certification to ensure that its qualified network can provide comprehensive recommendations and upgrades to the building occupant. Their expertise is maintained with regular training on program offerings and standards they must follow.

On the other hand, some program administrators noted that contractors in the region were often small, owner-operated entities, many of whom were approaching retirement

age and resistant to training or learning about new technologies. Regardless, strong contractor involvement led to stronger customer engagement, with one utility using contractors to identify potential customers for energy efficiency upgrades because the customers in their service area do not understand utility programs well.

7.6 Summary of Utility Customer Engagement Strategies

7.6.1 Midwest

For midwestern multifamily customers, targeting building owners with in-person engagement helps promote and increase awareness of program offerings.

7.6.2 Northeast

Northeastern program administrators value education efforts to increase homeowner, renter, and landlord awareness of envelope improvements. Some programs leverage energy use comparisons on customer bills or compare customer usage to public real estate metrics on comparable homes. Non-profits support utilities and state program administrators to provide concierge services on envelope upgrades, serving as a source of information and developing long term client relationships to build trust. Education via public outreach campaigns or targeted efforts have the potential to make programs more efficient. Homeowners' desire for cost and energy improvements is the biggest driving factor for accelerating single family home envelope retrofits, and without clearly understanding the benefits, homeowners do not undertake envelope upgrades.

Another customer engagement challenge involves price transparency. Programs can work with contractors and customers to provide contextual information about the envelope jobs quoted, prices, and recommendations to help set expectations on a "good" weatherization job and the anticipated cost of installation.

7.6.3 Southeast

Southeastern utilities use similar tools as midwestern utilities to conduct customer outreach for their programs, including social media, appearing on Google search, billboards, targeted emails, websites, bill inserts, direct mail, and program cross promotion. Sometimes southeastern programs offer free energy audits, online energy checkups, or applications to track energy use to encourage customers to participate in energy saving programs. Southeastern utilities face similar challenges to the Midwest in garnering customer interest in envelope upgrades. Weatherization measures are under consideration by some programs, but offerings are limited by ratepayer impact measure test requirements.

Two utilities found approaches to engage customers and deliver savings through envelope upgrades. One utility, through a neighborhood efficiency program, directly engages neighborhoods with at least 50% of residents at or below 150% of the federal poverty level. This method is a proactive and customer-focused strategy that provides no-cost installations for customers. They engage with families and local stores to provide education and foster deeper community connection. Another utility, serving 10 million customers across several states, works with local power companies to

implement its whole home retrofit program. This program offers no-cost upgrades to the customer and reduces energy use by 25%. The centralized design and large reach allow the utility to build and train an extensive contractor network and coordinate with state offices to bundle rebates in support of the customer.

8 Conclusions

Midwestern, northeastern, and southeastern utility program administrators for ASHP, HPWH, and envelope measure programs face shared challenges including contractor skepticism to technologies, high upfront costs for envelope upgrades, limited customer engagement opportunities, low engagement in downstream approaches, and coordination challenges between heat pump and envelope contractors. The potential solutions listed below are derived from existing utility programs that have employed program adaptations to improve customer and contractor engagement and participation in their offerings. Potential solutions include using contractor-trusted sources of information for education on technologies, partnering with local organizations to increase incentives for customers, taking advantage of contractor interactions with customers to relay information on potential upgrades, shifting to a midstream or upstream model, and exploring tiered or braided incentive structures.

8.1 Common Challenges and Potential Solutions within Utility Energy Efficiency Programs

Contractor Skepticism to Technologies

Midwestern and Southeastern utilities face the challenge of contractors' reluctance and resistance to promoting newer technologies, such as heat pumps and HPWHs. Without contractor buy-in and confidence to sell the technologies, utility programs face low participation and low customer awareness of the options available to them.

Potential Solution: Utilities emphasized the need for third-party verified information on technologies from government agencies or sources who were not selling the technologies. A third-party source of information that explains comfort, savings, and other benefits may be perceived as neutral and trusted by customers and contractors compared to a salesperson telling them what to buy. One potential source of information could involve experienced contractors helping others work through the learning curve for service issues, margins, installations, and customer expectations. These contractors could share their successful installation and use of heat pump and HPWH technologies through word of mouth, especially in areas with strong informal networks that share learnings.

High Upfront Cost for Envelope Upgrades

High upfront costs remain the biggest challenge for envelope upgrade programs. Stakeholder engagement across the Midwest, Northeast, and Southeast highlighted that utility envelope programs are overlooked by consumers, prioritized less by utilities and contractors compared to the other utility rebate programs, or face difficulty in administration compared to other programs. The reduced priority is due to higher

interest in heat pump technologies, perceived as more interesting and exciting to offer to customers, compared to less visible envelope improvements. Rebates also only cover a small percentage of the overall upgrade cost, leading to reduced customer and contractor interest. Contractors seeing less profits from these programs also means they did not effectively promote them to customers, leading to a lack of customer awareness about envelope offerings. As a result, utilities deemed envelope measures as having too low or insufficient of savings to support.

Potential Solutions: Some utilities partner with gas utilities and non-profits to braid incentives and cover more costs for income-qualified customers. In the multifamily space, utilities programs create strategies to increase building owners' participation. For example, some utilities offer strategies to improve engagement by focusing on relationships with building owners and customers. Proactive customer targeting is a priority for many utilities offering multifamily programs, especially prioritizing relationships with property managers. One approach specific to property managers involves direct engagement to convince them to undertake comprehensive envelope upgrades with equipment improvements to maximize program benefits. These utilities feel that while a phased approach is more financially manageable for property managers, it slows the pace of improvements. To provide building owners with a better understanding of the benefits of upgrades, some utilities offer assessments before work begins to assess the buildings' needs and what rebates may apply to help meet them. These include ASHRAE level 1 assessments, blower door tests, and other evaluations. The assessments provide initial estimate savings that make envelope measures more financially feasible. Additionally, intrusiveness and upfront costs are reduced when building envelope upgrades are timed with other building retrofits such as re-siding.

Customer Engagement Opportunities Limited

Utilities noted that educating and engaging with customers in-person is a challenge due to limited resources. For this reason, typical engagement with customers relied on contractors, community events, bill inserts, and local media.

Potential Solution: Taking advantage of opportunities to connect in person with customers is key to improving customer engagement. One example of a strategic time is when contractors assist with emergency or routine equipment replacement. Emergency or routine equipment replacement provides a unique opportunity to educate customers on upgrade opportunities to replace their unit and receive potential energy savings from a highly efficient, new unit. One consideration for utilities who adopt this approach is understanding that they may not have visibility on how or what information is relayed to the customer. Some utilities have shared talking points to guide contractor-customer communication. Another strategy involved ensuring there was some touchpoint for customers with utility staff, who could provide clarifications on program options, rebates, and cross-over programs.

Low Engagement with Downstream Approach

Utilities struggle to increase interest in their energy efficiency programs and have low rebate submissions. Many utilities rely on contractors to submit rebates for customers and promote rebate-qualifying technologies to customers.

Potential Solution: Utilities with strong relationships with distributors and manufacturers can consider transitioning from a downstream approach to a midstream or upstream approach to streamline utility rebates. For utilities that have taken this approach, it alleviates the responsibility of rebate submissions from customers or contractors, allowing contractors to focus on quality installations and supporting customers to decide what technology best fits their needs. The utilities who have shifted to midstream stated that it led to a substantial increase in program participation, as midstream or upstream incentives enable manufacturers, distributors, and contractors to engage more actively in promoting energy-efficient products. Alternatively, utilities can assign networks of energy advisors or technical experts connected to the customer and contractor base to expand utility program awareness and answer any questions and concerns they may have.

Coordination Challenges between Heat Pump and Envelope Contractors

Combined or bundled incentives to support heat pump installations alongside building envelope improvements were notably absent in the Midwest, Northeast, and Southeast among utility program offerings. Utility staff shared that a possible driver of this situation is a desire to focus on delivering straightforward standalone rebate programs that avoid administrative complexities. “A la carte” measure options meet customers’ budget constraints and avoid pressuring customers into multiple measures simultaneously. Multi-measure packages increase costs and complexity, even if they add significant benefits, such as lowering HVAC load and allowing a smaller sized heat pump to be installed. Coordination challenges between HVAC and envelope contractors further complicate the ability to offer strong bundled or combined incentives, as HVAC contractors often want to sell larger capacity equipment, even though heat pump sizing is ideal after an envelope upgrade.

Potential Solution: Utilities can improve their programs by exploring tiered, bonus, or bundled incentives. Some utilities showed interest in or were actively investigating these options. One potential strategy involves using escalating bonuses to unlock higher incentive levels based on a customer’s commitment to upgrade installation. While this approach is rare, it could encourage customers to consider more projects. Additionally, it can be valuable to encourage envelope measure installations before customers commit to heat pump installations. Administrators can enhance programs to support this by supporting utility program teams with best practice resources for combining weatherization and heat pump incentives or encouraging collaboration between HVAC and insulation contractors to improve education and implementation.

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Table 10: Number of Envelope Programs Offered by Utilities Interviewed in the Midwest by State

State	Whole Home	Duct Insulation / Sealing	Attic Insulation	Roof Insulation	Air sealing	Wall Insulation	Energy Efficient Windows/ Attachments
IA	1	2	2	1	2	2	0
IL	0	2	3	0	3	3	0
IN	0	2	3	0	3	1	0
KS	0	1	0	0	1	0	0
KY	0	3	2	0	3	0	0
MI	0	1	4	2	3	2	3
MN	3	0	3	0	3	3	1
MO	1	3	3	0	2	1	0
ND	0	0	0	0	0	0	0
NE	1	0	3	0	1	1	0
OH	0	0	1	1	1	1	1
SD	0	0	0	0	0	0	0
WI	0	1	1	0	1	1	0
Total	6	15	25	4	23	15	5

Table 11: Average Minimum Envelope Rebates Offered by Midwest Utilities by State and Measure Type

State	Whole Home	Duct Insulation / Sealing	Attic Insulation	Roof Insulation	Air sealing	Wall Insulation	Energy Efficient Windows/ Attachments
IA	-	-	-	-	-	-	-
IL	-	-	-	-	-	-	-
IN	-	-	-	-	-	-	-
KS	-	-	-	-	-	-	-
KY	-	$250	$250	-	$250	-	-
MI	-	-	$50	-	$450	$50	-
MN	-	-	0	-	$750	$1500	-
MO	-	-	$300	-	-	$300	-

State	Whole Home	Duct Insulation / Sealing	Attic Insulation	Roof Insulation	Air sealing	Wall Insulation	Energy Efficient Windows/ Attachments
ND	-	-	-	-	-	-	-
NE	-	-	-	-	-	-	-
OH	-	-	-	-	-	-	-
SD	-	-	-	-	-	-	-
WI	-	$75	$200	-	$200	$450	-
Total	-	$192	$160	-	$313	$575	-

Table 12 : Average Maximum Envelope Rebates Offered by Midwest Utilities by State

State	Whole Home	Duct Insulation / Sealing	Attic Insulation	Roof Insulation	Air sealing	Wall Insulation	Energy Efficient Windows/ Attachments
IA	-	$50	-	-	$200	$200	-
IL	-	$400	$500	-	$400	$400	-
IN	-	$100	$350	-	$350	-	-
KS	-	$250	-	-	$300	-	-
KY	-	$300	$325	-	$467	-	-
MI	-	-	$300	$400	$150	$263	-
MN	$2,800	-	$1,167	-	$900	$1,233	-
MO	$1,200	$275	$400	-	$300	$300	-
ND	-	-	-	-	-	-	-
NE	$1,000	-	$633	-	$1,000	$1,000	-
OH	-	-	$500	$800	$500	$500	$500
SD	-	-	-	-	-	-	-
WI	-	$150	$675	-	$1,125	$450	-
Total	$1,667	$240	$578	$600	$548	$643	$500

Table 13: Total Programs and Population Covered by REEO Interviews by State

State	Total Utility/State-Administered Programs Reviewed	Percent of State Population Covered by Data[33]
IA	4	58%
IL	4	79%
IN	4	50%
KS	1	80%
KY	3	39%
MI	7	88%
MN	4	25%
MO	4	51%
ND	2	12%
NE	4	29%
OH	4	13%
SD	2	8%
WI	2	100%[34]
Midwest Total	**45**	**Midwest Average: 53%**
CT	1	100%
DC	1	100%
DE	1	100%
MA	1	100%
MD	1	43%
ME	1	100%
NH	1	100%
NJ	2	53%
NY	2	100%
PA	3	69%

[33] Number is an estimate of the population served by the electric utilities or state programs interviewed by MEEA, NEEP, and SEEA. Data for electric utility customer populations were derived from U.S. EIA data.
[34] A 100% customer population coverage indicated that a state-wide program was interviewed in that state and the programs were available to the entire state population. It was possible that other smaller utility programs were also reviewed, but there was no publicly available data on customer populations.

State	Total Utility/State-Administered Programs Reviewed	Percent of State Population Covered by Data[33]
RI	3	100%[35]
VT	1	100%
WV	1	41%
Northeast Total	**19**	**Northeast Average: 85%**
AL	N/A	62%
GA	N/A	58%
FL	N/A	7%
LA	N/A	12%
MS	N/A	12%
NC	N/A	66%
SC	N/A	50%
TN	N/A	76%
Southeast Total	N/A	**Southeast Average: 43%**